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Controlled Mating of Honeybees

Part One — The Search For a Practical Method

By Dr. Lloyd R. Watson

AMONG insects, the honeybee and the moth of the silkworm are directly beneficial to man, and the cochineal, the shellac, and the China wax-producing insects follow at some distance. In spite of the fact that no other insect has received such patient and laborious study as has the honeybee, it seems true that only a fair entry has yet been made into this veritable mine of biological treasure.

To most people the bee is a sort of manageable animal with an irritable and offensive disposition. On account of the warfare which, on occasion, it wages by means of its sting, the honeybee is popularly regarded with terror. So attractive is honey, both to man and to many of the lower animals, that, except for the respect exacted from all living forms by the venom of the sting, it seems almost certain that bees would have been completely exterminated long ago.

The correlation between the well-being of plants and of insects is so close that it seems probable that if insects were suddenly removed from the earth the majority of plants would also gradually disappear. Our dependence upon the work of honeybees to pollenate most of our valuable fruits results in a distinct relationship of mutualistic symbiosis. Except for the existence of honeybees the name of beeswax would not occur in our dictionary.

Furthermore, in the laboratory of its body, the bee outwits the researchers in our chemical laboratories in that it can take simple carbohydrates and process them so as to yield at the end waxes, which in turn resist almost perfectly any of the processes of our digestion. The larva of the hated waxmoth then enters the scheme of things and, uninvited, demonstrates the changing of this wax back to carbohydrates, fats and energy. Thus we men look on with mingled envy and admiration at these magical transformations, but we ourselves cannot yet repeat them with reagents and test tubes.

> This is the first of three articles by Mr. Watson dealing with controlled mating of the honeybee. In the next issue he will give detailed information as to how he accomplished this result.

Fossil indications show that hymenopterous insects were in existence on the earth in the Mesozoic Age, and insects of various kinds have been found in every part of the earth, even in the polar regions. The "blood" relationships of honeybees to other insects are very imperfectly understood, but we know that, as a species, bees are very well stabilized, for no noticeable morphological change seems to have occurred in them during the last 3,000 years. Aristotle, Pliny and Cato were enthusiastic writers about the honey-makers, and the descriptions of Virgil in the fourth book of the Georgics still bristle with interest. These ancient writers were familiar with the large, sedate member of the hive and called it the "King Bee," and they postulated that this bee ruled the colony. It appears that it was an Englishman by the name of Butler who first among writers about bees recorded in 1609 that he had observed the "king bee" laying eggs, and suggested that in the popular parlance its sex should be changed.

In 1737, the Dutch naturalist, Swammerdam, established the female sex of the "king bee" by dissection. In his drawings, which appear marvels of accuracy and detail, he figured the seminal reservoir, or spermatheca of the queenbee, but he quite overlooked its true function, supposing that the mucilaginous substance it contained was for sticking the eggs to the base of the cell. He noticed that when several drones are confined together in a small room, as a bottle, they emit a strong characteristic odor, "odoriferous effluvia," to produce which required a large number of them in the hive. He seems never to have elaborated his theory to explain how it was possible for a queen to lay fertile eggs in the spring after wintering in a colony destitute of drones.

Another theory of the time assumed that all eggs were unfertile when laid, but that those which were destined to produce workers and queens were fertilized by the drones after they were laid. It is hard for us with the more advanced tuition of our time to appreciate how such easily demonstrable facts could be so long misunderstood.

In 1740, Reaumur, the inventor of the thermometer, and his friend Bazin, correctly guessed the function of the spermatheca. Not long afterwards Arthur Dobbs also accurately described this organ, and in 1792 John Hunter read a paper before the Royal Society of London in which he satisfactorily accounts for the fertilization of the eggs of a queen from the contents of the spermatheca.

First Jansha, and later Huber in 1789, led us a step nearer to the truth by demonstrating that the queenbee leaves the hive for her mating and meets the drone on the wing. To the mind of Huber was

presented the desirability of some means of controlling the mating of the queen, and he attempted, though unsuccessfully, to accomplish this by introducing into the vulva of the queen sperm from a selected drone on the point of a fine hair brush. The desire in some practical manner to exercise this control over the breeding of bees has continued to the present time, and many experimenters in many lands have not ceased to attack the problem by every conceivable approach for nearly 150 years.

The known attempts to control the mating of the queenbee may be classified under two general heads: (1) the isolation of the virgin queen with one or more selected drones in a limited range, or on a leash, and (2) forced insemination by violent, or by surgical means. From the various published experiments which may be found scattered through the professional literature, the following list has been catalogued. This list is probably incomplete, but we believe that it is representative:

(1) Painting the vulva of the queen with sperm. Huber.
(2) Queen exposed on a leash. Shrimplin. Shuck. Shafer.
(3) Queen confined in a limited range with selected drones. McLain. Davitte. Rowsome. Root Company. Sladen.
(4) Dropping male juices onto larva and pupa queens. McLain.
(5) Dropping male juices into open vulva of queen. McLain.
(6) Queen and drone held in juxtaposition. Shafer. Bishop.
(7) Painting drone eggs with sperm. Barratt. Quinn.
(8) Queen held in a block and injected. McLain. Jager and Howard. Howard and French. Bishop.
(9) Clipping off part of queen's wing. Aspinwall.

Varying degrees of success have been claimed in the use of a few of these methods. Some of these methods failed because they were based upon incorrect scientific principles. Others were sound in principle, but failed in practice probably because the technique employed was too coarse. So far as we know, none of the methods above catalogued have, in the hands of the experimenters listed, yet been proven practical for scientific or commercial use.

Nothing could be more fruitful in pressing home upon our consciousness an appreciation of how gradual and laborious has been the growth of our positive knowledge regarding these little communists than a consideration of the history of this progress. Nothing could more naturally fill our minds with adminration for the discoveries of blind Huber, or of Aristotle, Pliny, and Swammerdam, than to know that they were compelled to tear a hive to pieces in order to study its inside economy, and this too without the supporting argument of a modern smoker.

We all admire faith when it removes mountains, and a high degree of veneration for the removers of mountains of ignorance and error in this particular field of knowledge should ever tincture our contemplations. In our search for the truth we are dealing with facts, and facts are stern values. It seems that the spirit of genuine philosophy is never weakened, but it is rather reinforced, by a laudable skepticism which holds theories and claims in abeyance till they can be unquestionably demonstrated.

Concrete Floors

By Charles D. Cheney

IN the editor's "Personal Recollections," mention of the matter of a "dry concrete floor," etc., prompts me to take the liberty to bring to your attention an effective, simple and cheap method for making a concrete floor **truly dry**. The usual concrete floor is not "truly dry"—there is constant absorption below and a constant evaporation above. This causes more or less dampness in the atmosphere of the honey house, garage or cellar.

A cold car run into the garage, which is likely to be warmer than outside, sweats, and rusts more or less. You may or may not have noticed the morgue-like feeling when the garage is first opened. This is due to the humid condition, as suggested.

In 1910, I began beekeeping as a backlotter (I am that yet) and proceded to remodel and enlarge a 6x12 movable chicken house for a honey house. To dispose of the old three-ply tar roofing was a problem. It suddenly occurred to me that I might "bury it" under the concrete floor that I would lay in the house. So I leveled and tamped the earth solidly and placed the roofing carefully to cover the earth. The concrete was placed directly on the tar roofing. That was in May. In September my son and some chums "camped out" in the shanty, as we call it, making their bed on a mattress laid directly on the concrete. There was not the slightest dampness noticeable. I may mention that the shanty has a chimney and fireplace, so they cooked meals and had a real camp. There is running water in summer.

There has never been a speck of frost on the shanty windows, regardless of temperature!

The results attained by that damp-proofing were so thoroughly satisfying that when I built a garage I did the same, except that I purchased asphalt roofing felt for the purpose. This was even a greater benefit in the garage—no frost on the windows nor sweat on the car. The garage **always** feels warmer than the atmosphere outside. Since that, I have supervised the building of two two-car garages and prepared plans and specifications for a two-room addition to a daughter's house, in all of which this damp-proofing method has been used with complete satisfaction. The expense for material and labor is trifling—not worth considering.

Now, to get back to bee cellars. I believe that a large part of the troubles cited about restless bees, etc., might be traced to excessively moist atmosphere. Temperature by itself is another consideration. If there is too much moisture, increased ventilation is necessary. This may be objectionable for other reasons. However, as I see it, there can be no objection to having the cellar as dry as it can be made, without recourse to special ventilation.

This theme of damp-proofing may, I think, well include mention of some of my conclusions in relation to moisture in, or of, the hive. In the early years of my beekeeping I made heavy jackets of old carpet and slipped these down over the single-wall hive body and wrapped with tar paper, all thoroughly weather-proof. When the tar paper was removed in the spring those jackets were **dripping wet.** I'll say nothing here about the inside of the hive. Where did that wetness come from? The only possible answer is: Through the hive wall, which was seven-eighths of an inch thick and well painted on the outside. We hear and read rather frequently of unsatisfactory wintering in double-wall hives. I have never seen any logical explanation, though there have been not a few other than logical.

If, as I have related, dampness can pass through a ⅞-inch hive wall and condense to the point of actual wetness when prevented from evaporating, how much easier for it to pass through the ⅜ or 5-16 wood used in the double-wall hive, and condense in the packing, thereby making the double-wall construction no better, or far worse than the single wall.

Fortunately this can all be prevented by effectively water-proofing

the inside of the wall, both single and double. It will probably be said "the bees will do that," but it is not done effectively, if it is really done at all. There must be no uncertainty about this if it is to be effective.

I have had the best of results by the following method, which I have used for many years, and would not do without:

Upon the clean wood apply hot melted beeswax (or, better still, paraffine, which is positively non-absorbent and far cheaper) by means of a hot flatiron or a blow torch. When once well done it lasts indefinitely. This also simplifies disinfection in case of American foulbrood. Just use the hot flatiron or blow torch, which is preferable; actual scorching is not necessary. The inner cover should be treated also. When thus treated, whatever moisture condenses on the hive wall runs down as water to the bottom and out. It is eliminated entirely. My hives are always tilted up at the back.

New Jersey.

British Standard Hive—Double Brood Chamber

By Lt. Col. G. Stoney Archer

THE hives in the photographs are my own design, somewhat similar to the American standard hive, but modified to take the British standard frame. An average comb in one of these frames gives five pounds of extracted honey, and as it can be uncapped with one stroke of a long uncapping knife, this British standard frame is most convenient for supering.

I also maintain that it is a suitable size for forming a convenient and correct sized brood chamber when worked on the double brood chamber principle, in British standard brood boxes. Each of these brood boxes contains ten frames, and the comb in each frame contains approximately 5,000 cells; therefore the double brood-box hive such as you see in the photograph contains 100,000 cells, which gives a good queen sufficient room to lay in the summer, and also provides room for honey and pollen for breeding up to the honeyflow. Then, of course, further brood boxes are put on as supers. The queen being established in a double brood chamber of sufficient size (about the same as the modified Dadant), is not likely to go up into the third box, but should she do so it is of no consequence, as any comb

Scale hive, double brood box system. 100,000 cell capacity. Complete weight, 112¾ pounds.

spoilt for extracting can be put down below, as all the frames are interchangeable. There is therefore no necessity to use queen excluders, which I say are honey excluders and swarm producers. The British standard frames are spaced one and a half inches apart, and I find that by using them in my Anglo-American hive, I get most satisfactory results and only about 10 per cent of swarms. From what I have said you will see that the system I have adopted is the Dadant system, in a hive the same size, or rather same cell capacity, as the modified Dadant, taking twenty British standard frames.

These few remarks about the British standard frame used in a double brood chamber on American principles may be of some interest to your readers, as showing them what some of us are doing on this side of the water.

England.

A Good Story

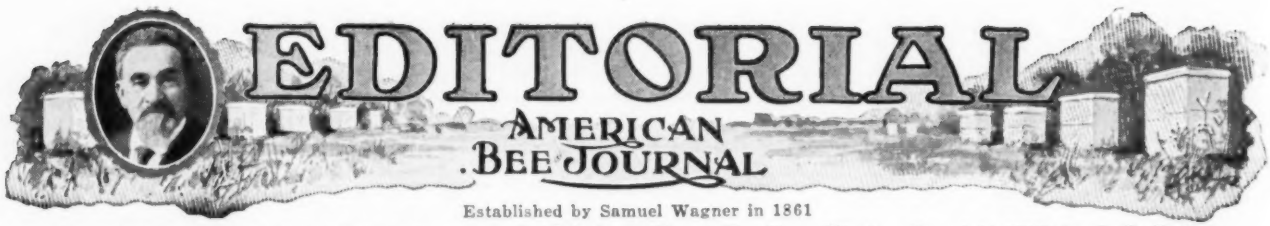
The Florida Times-Union, of Jacksonville, had a very good honey story in a recent issue. A considerable space was given to an account of the large apiaries in the tupelo district and the quality of the famous tupelo honey, which does not granulate. It was written by Dudley V. Haddock, special representative of the Florida State Chamber of Commerce. Stories like this, which acquaint the public with the facts concerning a high quality food product, will insure a demand for it which will overcome the present handicap of low price and slow movement.

Honey Booklet

The Kellogg Company, of Battle Creek, Michigan, has recently issued a very nice little booklet, "Do You Like Honey," which contains several recipes which call for honey in making muffins, pudding, cakes, etc. These booklets are sent free on request and any of our readers who can make use of them should write to the Kellogg Company for a supply.

Tool house with decoy hive on top. One swarm hived itself this way last summer

Part of my bee garden, the Cotswold Hills in the background



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The Huber Book

No work that we have ever done in the literary field of beekeeping has given us as much pleasure as, and more complimentary comments than the late translation of Huber's "New Observations Upon Bees." This is the more flattering because the original work is already 113 years old. Few works of this age are readily accepted by the public.

The last critical mention given to the public of our translation appeared in the April number of the valuable magazine, "Science Progress." The criticism is by Herbert and Evelyn Mace. Evidently these critics read the work together, using both original and translation, the very best way to examine a translation thoroughly.

The review contains about eight pages, five of which are devoted to appreciations of Huber. The other three pages scrutinize the translation closely. Most of their criticisms on the mechanical work were already made by a writer in the Bee World last year. We are glad to see that so few passages need correction and that some corrections are rather fastidious, as for instance denouncing the word "beautiful" as translation of the French adjective "beau," recommending "remarkable" as more appropriate.

Such criticisms are certainly an elaborate use of what the critics call "literary sandpaper." They are welcome.

Apiary Insurance

The "Bulletin of the Romande Society of Beekeepers" of French Switzerland publishes in its April number some very interesting matters concerning beekeepers' insurance. The Romande Beekeepers have an insurance association, to which the members pay an annual premium of, I believe, one cent per colony. During the year 1926 the association insurance settled some claims for thefts amounting to 50 francs ($9.65).

There are other associations of the same kind in Switzerland, the "Helvetia," the "Winterthur," and perhaps some others. In both of the above named associations small claims were settled for theft, for stings sustained by people passing or working in the vicinity of the apiaries. The entire sums paid by these bee insurance associations, during 1926, amounted in all to 440 francs ($85). In as thickly settled a country as Switzerland, accidents are much more frequent than in our own country.

Bees In the Schools

Mr. V. W. Binderup, of Minden, Nebraska, is an enthusiastic beekeeper. He has a class in nature study in the local schools each Tuesday. Besides bees, he teaches of birds, trees and flowers. Naturally his class is taught to appreciate the advantages of the use of honey in the diet. Now and then he serves the students with a banquet, at which time everything served is made with honey.

Introducing Queens

Now that the time of queen purchasing is at hand, it is well to tell the beginner, and perhaps some of the old beekeepers, not to kill the old queen until the new queen is at hand and is ready for introduction. Many imagine that a colony will accept a queen more willingly if the hive is queenless. But the bees go to work and build queen cells, and a colony with queen cells is less apt to accept a strange queen than one whose queen has just been removed, especially if the old queen is caged for a little while in the introducing cage that will contain the new one. Besides, it is a mistake to kill the old queen until we know the new one has been accepted. A queen may be held safely in a cage for several days, perhaps several weeks, if accompanied by some of her workers.

The Moist Weather and White Clover

In all parts of the country where the exceedingly moist weather of spring has ruled, the condition of the white clover is better than in any of the past ten years. Watch your colonies when the crop comes and supply them with plenty of room. The senior Dadant used to say that the crop begins about three weeks after the appearance of the first clover bloom, but this may depend upon locality. At any rate, when the bloom promises to be as heavy as present conditions indicate, it is well to follow the coming of the crop closely. I remember giving an apiary some combs of honey from the previous year while it was raining daily and they were short. The skies cleared soon after and the bees added honey to those combs instead of taking any of it away.

The King of Spain a Beekeeper

"La Colmena" (The Beehive), apiarian review published at Madrid, in its February number contains an article describing the king's interest in the keeping of bees and his recommendations towards an exhibition of bee products.

The same magazine, in a special plat showing the different methods of beekeeping, describes the old style hives, straw, logs, box-hives, and compares the results of such beekeeping with the modern styles, stating that an average of 30 to 130 pounds of honey may be secured from the modern methods, while the old methods limit the crop to an average of about 18 pounds.

Moist Locations Not Desirable

We have lately noticed, in an apiary where the colonies are in rows, some of these rows being very near to the bottom of a narrow valley, the rows of colonies nearest the low place, where moisture accumulates and hangs on, suffer a great deal more in the winter and spring from excess moisture and lose many more bees than those in higher spots. This is intelligible and deserves to be watched. If the colonies cannot keep their atmosphere comparatively dry, they are bound to suffer more than in a drier atmosphere.

Beekeeper Honored

N. S. Graham, a beekeeper of Powell, Wyoming, was appointed a member of the State Board of Agriculture, April 2, to succeed John Hendricks, according to a recent announcement.

The Best Races of Bees

This question comes to us so often that I have thought best to give an editorial comment upon it.

What we want in bees is, not only the best gatherers, but also the best bees to handle and keep about the farm or the home. Among the common bees, there are very positive differences, and Mr. Baldensperger affirms the existence of two different races, the little black bee and the brown bee. The former is quick in action, restless and cross. When its hive is opened it hurries about and most of the bees will gather together in a cluster, at the bottom of the comb which the beekeeper holds, and fall to the ground, thence crawling in every direction. Smoke only increases the excitement. The brown bee, a little larger in appearance, is much quieter and holds to the combs as does the Italian.

But are these two races very positively apart, or are they varieties existing through the country? In France, where both are said to exist, there is no wall between them, no snow-covered mountains to keep them apart. The black bee is said to live in the North, while the other lives in the South. That is all.

The Carniolan and the Caucasian appear to have similar habits to those of the brown bee. They are very similar also in appearance, showing only hair more greyish, when in their prime. The Carniolan swarms excessively; this is due, they say, to their having been kept for centuries in hives that are too small for their breeding. Both of these races are quiet and hang well to the combs when the frames are lifted out.

The Italian, when they are pure, are as quiet as the best of the other races and hang to their combs so that one can take a frame loaded with bees and carry it anywhere without having any bees drop off or offer to sting, if the work is done carefully. I have often carried a comb of brood, bees and queen, from the apiary to the house and passed it around among lady visitors, without a single bee offering to sting or to drop off. I don't know of any other race with which this may be done.

The Cyprian is a very active race and may be handled safely at times. But it is irascible and, when once aroused, will keep threatening and stinging till one is positively tired of the annoyance. We see the same opinion of them in many directions. Mr. Etienne Giraud, president of the National Federation of French Beekeepers' Societies and a beekeeper of long experience, notices, as I have often done, that smoke frightens the Cyprians, but does not subdue them. Their behavior, under the smoker, is a quick reaction, a noise like that of meat dropped into the hot frying pan, zzzzz; as soon as the smoke is cleared away they are ready to jump at you.

All the races above mentioned, except the first, are kept apart from one another by chains of mountains, with very rare exceptions, such as the defiles along the Riviera, where some of the bees mix. Carniola, the Caucasus, are isolated by mountains. In the latter country there are a number of mountain chains, so that the bees of southern Caucasus, those of Lenkoran, differ entirely from the Caucasians of the vicinity of Tiflis, which is just south of the main Caucasian chain.

Regarding their greater or less tendency to store propolis, if there is a difference it is most likely due to the greater danger of enemies, in the southern countries, which would, of course, induce the bees of the south to store more propolis. But my experience has been that they store the greatest amount of propolis in localities which have the largest amount of gum-producing trees, such as the cottonwood or poplar. If they have a time of dearth of honey, in summer, they take advantage of this to gather propolis. All the races, I believe, will do this. Our bees along the bottom lands of the Mississippi gather more propolis than those on the hills, although they are of the same race.

One suggestion I wish to make. In the summer of 1900, at the International Congress of Paris, I heard a French priest state that the temper of the races is transmitted by the male. I believe that this is correct, for the hybrids of our Italian queens mated with black drones have always proved crosser than the hybrids of our neighbors' black bees mated with our Italian drones. I have lately read a similar remark, although I cannot remember where.

From all this, what do I conclude? I would not try to rear Carniolans or Caucasians, because they are so near in appearance to the common bee that it is difficult to detect a mismating. But the Italians have about as favorable characteristics as the Caucasians and whenever there is a mismating it is easily discovered. But by all means do away with the little black bee. They are the poorest honey gatherers, as well as the most unpleasant to handle.

It is probably well to add that the qualities of a race of bees display themselves most satisfactorily in a climate somewhat similar to the climate under which they originated. Thus we found out that Italian bees are not satisfactory in the climate of Switzerland, even though those two countries are adjoining; because the climate of the mountains of Switzerland is altogether different from that on the south side of the Alps. Similarly, we hear that the Italian bee is worthless in northern Scotland and not very satisfactory in any part of the British Isles. It is out of the question to conclude that, because a race is good in one climate, it will be satisfactory in every climate.

Professor Francis Jager

Professor Francis Jager, of the University of Minnesota, and Mr. Lionel Hopkins, one of his beekeeping students, have just concluded a tour of the southern states and came through Hamilton, on their way home, on April 7 and 8.

Professor Jager is an interesting man. Born in the Balkans, in Carniola, he is very much enthused over the Carniolan bees, of which he has a number of colonies in his apiary. Mr. Jager is acquainted with a number of the languages of central and eastern Europe and it is interesting to hear him explain how it came that Roumania retained a Latin language, with the Roman letters, while some of the neighbors of that kingdom have retained and are still using a mixture of Greek equivalents, most difficult for western nations to comprehend.

Professor Jager visited many of the southern breeders of bees and has urged upon them the necessity of adopting a shipping case or cage, for bees by the pound, that may be easily inserted inside of an ordinary hive body. In order to hive bees just received, he argues that the best method is to place the cage containing the bees within an empty hive under a body of full combs or comb foundation. The bees are released in the evening and, during the night, migrate of their own will to the combs thus offered them, without the loss of a single bee, while bees in a case that is too large to go inside of an empty hive, whether the fault be with the length, the width or the height, are in a more difficult position to be hived without loss of some of their number. We believe the matter is worth consideration at the hands of the southern breeders.

Need of Cooperation

The need of cooperation in the sale of honey is felt wherever beekeepers have adopted modern methods and are in consequence getting larger crops than by the old systems of box-hives or skeps. We see it looming up everywhere, in the U. S., in Europe, in Australia, in New Zealand.

The "Australasian Beekeeper," in its February 15 number, urges the beekeepers to get together in "conferences." It says:

"Will you round up your neighbor and muster a conference to be proud of, from which all shall return pleased? Or shall those that come go away disgusted—not with the loyal members who will surely be there, but with those who stayed away without dire reason, the standbacks who never help the industry but want all the benefits just the same, the surplus drones of apiculture?"

Yes, we need to work together if we are to get the full benefits of our industry.

Five hundred colonies of Le Gatinais "Non-Swarming Bees," packed ready for shipment to England. The hives are covered with rubberoid and the screened tops underneath covered with newspapers. The colonies were being held till the English strike would permit shipment to France.

Can Beekeeping Pay?

By William Wilson

IN the "Scottish Beekeeper," Mr. William Wilson, of the Gatinais province of France, writes on the above subject and holds that beekeeping can be made to pay even in Scotland, where he was born.

Mr. Wilson is the beekeeper who, a couple of years ago, wrote for the American Bee Journal an article in praise of the French "sainfoin," which is the producer of the best honey in France. Mr. Wilson now has some twenty apiaries in Gatinais in partnership with a Mr. Benton. Mr. Wilson is an old and experienced beekeeper who has had many ups and downs in the bee business. He writes to us as follows:

"As I am having a quiet time, owing to the main pressure of our season being over, I am penning a line, along with two photographs, that sometime you may find convenient to fill up a corner in the American Bee Journal. One of them is showing five hundred colonies of our famed Le Gatinais bees, all in traveling boxes, ready for shipment to England, while the other is a picture of one of our fifteen apiaries. It is an ideal site, being finely exposed to the east and south and sheltered on north and west. The picture was taken in May, before the supers were put on. In the photo is myself, my partner beside me, with soft hat, and our four assistants. It is an international group, as I am Scotch, Major Benton English, and our four assistants are French, Italian, Roumanian, and Cheko-Slovac, respectively.

One of Wilson and Benton's fifteen apiaries at Faronville in Le Gatinais district of France

Someone has blundered, in Dr. Phillips having left France without paying our district a visit. It is not only the very best district in France for beekeeping, but I believe there are more commercial beekeepers in it than in any other part of the world of a similar area. Within a radius of twenty miles from here, I fully believe, there are 20,000 colonies kept, and I regret that Dr. Phillips has missed the real titbit of European beekeeping. I would have liked to have welcomed Dr. Phillips here.

I regret to say the honey season in France has been the very worst on record, owing to the weather being wet all the time of the first sainfoin bloom. Honey is in consequence selling at a premium, being nearly three times the price of last year. I fully believe that the only crops that have been harvested have been procured from Dadant frame hives.

Beekeeping In the Tropics

By Edward Kellner

The bees in the few apiaries which Mr. W. B. Gehrels owns down here in the Pacific coastal region are leather-colored Italians, brought into this country (Costa Rica) in 1916, from Texas. The first years, quite as if they seemed puzzled by the new conditions they found, they swarmed, though not badly, the whole year over. Now the swarming fever has settled down to a point that it is not a nuisance. A peculiarity of their swarming instinct is that it is receding soon to almost zero when the main flow begins, whereas in the temperate zone swarming fever increases with better nectar yielding. As to behavior, they cannot be classed as crosser than in our country, though they have to fight by far more enemies than in the temperate region. But, of course, if the beekeeper does his part in helping his bees, by keeping a watchful eye upon them, they can stand their enemies. Letting them alone may, especially in the tropics, lead to disastrous results within a short time, whole apiaries being wiped out by ants and waxmoths. The special danger with the various kinds of ants is not so much that they do attack the bees at all, but that their attack is unforeseen, sudden, and that their almost sure victory is gained quickly. Wasps, very numerous in the tropics, do not seem to care much about bees. Maybe they are not carnivorous as their larger brethren, the hornets. A great nuisance and more than it, sometimes a real danger to bees, is a small stingless bee, about half the size of the common fly, of a yellowish brown color. It goes into supers and hive bodies for honey, and if large forces of them are attacking, bees are known even to leave the hive and swarm out. A parallel of this brown stingless bee, the same in shape and size, but of dark metallic blue color, is harmless. Some kinds of birds are a great menace, especially for queens taking their mating flight. In September we lost, in the yards situated right on the seashore, about 15 per cent of young queens, probably the greater part of them by birds, swallows not being the least of them. Mr. Gehrels asserted that in some exceptionally bad years this percentage would reach 50 per cent. A greyish Iguana (lizard) is an enemy of less importance. Much more attention is deserved by a big toad, a monster of its family, eating bees by dozens. Like all toads, it goes hunting after sunset, and the beekeeper, therefore, has to do the same if he wants to free his yard of a dozen and more of these enemies.

Increase is made by forming three-frame nuclei from about August till the first half of November. In regular conditions a strong colony may give two three-frame nuclei, all going in full strength into the main flow, lasting from January to April, sometimes less, sometimes more.

As it seems to me, queen cells in swarming colonies are less in number than is the case with our common black bee in Europe. Note here the connection between less swarming and less queen cells.

In the Tropics the main flow almost everywhere comes from trees, other sources of nectar being of less importance. Therefore, apart from other circumstances, it is right to say, for the Tropics, the less cultivated the region, the higher the honey crop. Another item of great importance in the Tropics is the rainfall. In Costa Rica the Atlantic side has too much rain to be as good a bee country as the Pacific side. And again, on the Pacific side there are differences in the crop, of locations which seem to show the same conditions.

Prices of lumber for beehives during the last few years have gone to a tremendous height, nearly three times the former price. This is not encouraging to invest more capital in the business.

Costa Rica.

"Eat More Honey"

Homer B. Turrell

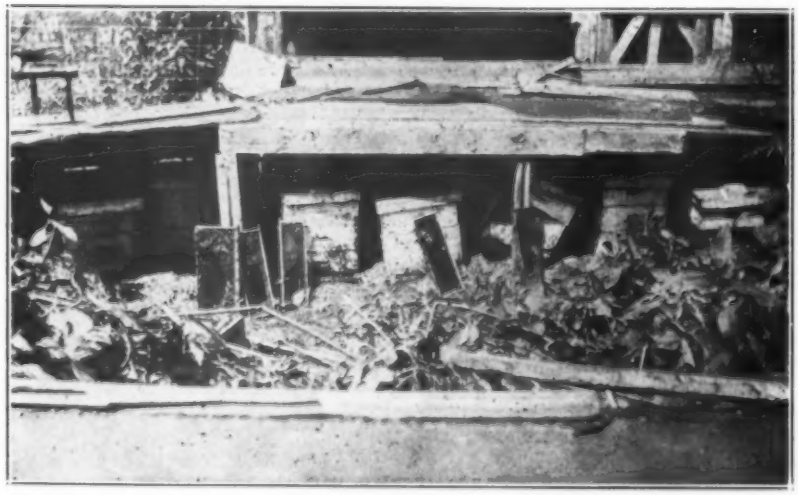
In the writer's opinion, this slogan is somewhat below par; the psycology is wrong. A great many people, when commanded to do something, will immediately do the other thing. They must be led on by gentle persuasion that does not awaken antagonism; their curiosity must be aroused.

No one who has studied the autobiography of Benjamin Franklin would be likely to adopt a slogan which is virtually a demand. Upon seeing it, the man in the street would likely say: "Why should I eat more honey? Who is this giving me orders? Is this some more propaganda? I'm fed up on that. I don't believe it anyway." So he drops it from his mind because he is not interested.

This slogan could probably be moulded nearer to the heart's desire by making it read, "Honey for Health." Everyone is interested in his health, so, immediately upon seeing this line, interest is awakened and the reader wants to know more about it. If the honey producers could only get all the food faddists on their side, the battle would soon be won.

In this land of dyspeptics and diabetics, one should be regarded as a natural benefactor who could attract the people's attention to such a safe and wholesome sweet as honey. It is astonishing that some of our writers of medical articles for the popular magazines have not taken up the subject. A paper from one of them extolling the benefits to be gained by both sick and well from eating honey would be advertising of the most desirable kind, and it would have the added advantage of being perfectly true.

One Way To Keep Bees



It may be presumed that the combs in this picture were just set there by the beekeeper. That is true—set there and left there. Can you imagine it, in this day and age? The worst of it is that this might be the apiary of any John Jones anywhere in the United States.

Adaptability of Young Bees Under Adverse Conditions

By Franklin C. Nelson

Contribution from the Entomological Laboratories of the University of Illinois, No. 109. An extract from a thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Entomology in the Graduate School of the University of Illinois

SOME work has been carried on to show the activities of both young and old bees in a normal colony, but little has been done to determine what might occur under abnormal conditions. For this reason three single, modified Dadant size frame, glass observation hives were maintained during the summer of 1925 to observe bees under various conditions. The first variation was started July 3. A brood frame containing a considerable amount of brood ready to emerge was placed in the hive. The comb also contained capped honey, a few cells of uncapped honey and empty cells, but no pollen, eggs, or young larvæ. A feeder of sugar syrup was supplied. The entrance was closed to prevent other bees from coming in or young ones from wandering out. They were left alone until July 6. At this time many had emerged and were at work cleaning cells. A queen was given them and all were marked with a green color. This made it possible to be positive of results and eliminated the possibility of outside bees coming in and carrying on the work without the writer knowing it, as some authors have suggested might occur. Observations were made several times a day until July 17. After this date only an occasional observation was made. The hive was opened July 9. This was a little longer than it should have been closed, but the writer wanted to eliminate any chance of straying or of outside bees coming in.

Detailed observations are omitted and a summary of results given below:

1. The bees were busy taking food from cells, or feeder, and cleaning themselves for the first two or three days.

2. On the third day they accepted and cared for a queen and polished cells.

3. On the fourth day they were trying to leave the hive as well as taking care of eggs and other hive duties.

4. On the fifth day some of them built burr-comb, cleaned out debris, fanned in the entrance and carried down sugar syrup from the feeder.

5. On the sixth day nectar or water was gathered and honey uncapped.

6. On the seventh day nectar evaporation was added to the other duties above. Field work was carried on.

7. On the eighth day considerable nectar had been deposited in the cells.

8. On the ninth day no additional duties were noted.

9. The tenth day showed pollen gathering started. The colony also swarmed out, but was recovered.

10. On the thirteenth day larvæ were being capped, but none was completely capped until the fifteenth.

11. Later observations showed honey stored and capped, young bees emerged and a good, strong observation colony built up.

Variation Number 2

The second variation from normal was a considerably more severe test than the first. On July 13, at 3:00 p. m., two frames of emerging brood were caged and allowed to emerge in the hive until July 15, 3:00 p. m., when the new bees were placed in an observation hive containing nothing but an empty, partly drawn comb and a feeder of sugar syrup. No nectar, pollen, honey, larvæ, eggs or brood were present. No old bees were present and the entrance was closed. About 2500 to 3000 young bees were used and all were marked the day they were placed in the hive. A laying queen was given them as soon as they were placed in the hive. The entrance was opened on the second day. Several daily observations were made and recorded, but only a summary will be given here. It may readily be seen from the results below that even young bees are quite capable of adapting themselves to the work of the hive under adverse conditions. It may be that some observers will be inclined to think that the two-day emergence period in the hive allowed the young bees to learn by observation some of the hive duties. The preceding experiment, in which the young bees were never with old bees, fully shows the fallacy of any such theory, and other reasons are needed to explain this inherent knowledge. For ease of comparison, a list of things done by this colony on certain days is given below:

1. First two days young bees emerging. No observations.

2. On the third day they polished cells, fed the queen and moved sugar syrup.

3. On the fourth day they cut down high comb.

4. On the fifth day a play flight occurred. Sugar syrup was deposited in cells.

5. On the sixth day the hive was being cleaned out. The queen laid eggs for the first time.

6. On the seventh day nectar or water came in for the first time. A taste of it showed that some of it was nectar.

7. On the eighth day pollen came in for the first time. A strange bee fought at the entrance.

8. Bees worked in egg cells on the tenth day. They may have done so before, but were not seen.

9. Larvæ hatched out on eleventh day. (Probably some hatched on ninth or tenth day, since capping took place on the fifteenth.) Bees must have worked in egg cells on eighth day, if moisture is necessary for hatching and three days are needed for an egg to hatch. Comb was being drawn out. Liquid in larval cells indicated feeding.

10. Bees fed larvæ on twelfth day.

11. Started to cap larvæ on the fifteenth day.

12. Carried on all hive duties and increased their strength until a strong colony was built up and apparently all normal conditions established.

Variation Number 3

The third variation was the most severe. Cages were placed on emerging brood at 1:30 p. m. July 10 and left in the hive until 1:30 p. m. July 11. The young bees were then placed in an observation hive with nothing but foundation, a queen and a feeder of sugar syrup. The entrance was closed. When they were run in they went to the bottom of the hive in a tight cluster and could not be separated. About 2000 to 2500 bees were used. On July 12 some of the bees took sugar syrup and chewed at the foundation. There were many dead ones in the cluster. On July 13 part of the bees were alive and feeding slightly on sugar syrup. On July 14 the bees that were alive were clinging to the foundation. The dead bees were removed by the writer. On July 15 some of the bees tried to go outside, but the entrance was closed. There was not much activity. The bees gradually died and were finally removed on July 19. The queen was still alive. A new lot of similar bees was introduced. These remained in the hive up to August 3, when most of them were gone. Observations during this time showed that some of the hive duties were carried on, but not extensively enough to be successful. The following observations on this colony show how much they

were able to accomplish. About half the bees were smothered. They were taking syrup:

July 22. Bees clustered on each side of foundation. A few ran over the foundation and visited the feeder. An electric light was placed under the colony, as weather was cool. The bees spread out as soon as they became warm. Many hung on the glass, evaporating sugar syrup. The entrance was opened.

July 23. Bees marked with green Klondike paint as before. The colony was active and a few played in the entrance. Many chewed at wax. A few cells were drawn out about one-sixteenth of an inch.

July 24. About one-half of one side of the foundation was drawn out from one-third to one-half of regular cell depth and some sugar syrup had been placed in these cells. One bee carried a dead bee out of the entrance. They were fastening comb to frame as well as drawing out cells and evaporating sugar syrup. At 4:30 p. m. a few flew outside.

July 25. Bees were not drawing cells any farther, but were working on other parts of the foundation not drawn. A small festoon of bees was seen, but no wax scales could be found.

July 26. Most of the bees were hanging on comb, evaporating sugar syrup solution. Cells were not drawn out any deeper. No wax scales could be located on the bees. There was no flight, as the weather was cool. At 5:00 p. m. the queen attempted to lay eggs in the partly drawn cells, but was not successful.

July 27. No flight in the morning. No eggs in the cells. At 12:00 noon a marked bee came in loaded with nectar or water. Several came in loaded during the afternoon. A fair play flight occurred at 1:30 p. m. No pollen was brought in. At 6 p. m. the queen laid four eggs in the partly drawn cells. The abdomen was not in far enough to be compressed by the cell and, according to one theory, the eggs should have been drone eggs. This was not decided, as they never hatched. No wax scales were seen.

July 28. Two bees with one small wax scale each were found at 8:15 a. m. This was the first indication of wax secretion. No large scales were found. The cells had not been drawn out any more, being apparently as deep as possible until more wax was added. The eggs laid July 27 were not present and must have been destroyed.

July 29. About twelve eggs in cells. No pollen yet.

No more observations were carried on by the writer, but George E. King made a few notes at a later date. On August 1 the queen was still present and a few scattering eggs were in the cells. The sugar syrup in the cells was beginning to granulate. On August 3 most of the workers were missing. The cells had apparently no new wax added. No larvæ ever hatched. On August 5 the colony was practically gone.

From these two attempts it would seem that day-old bees on foundation cannot manage to carry on and build up a good colony. They did manage to take care of the queen and themselves for several days and also to draw out the foundation a little as well as to deposit sugar syrup in it. They apparently ripened some of the sugar syrup, but must not have done a thorough job of it, as it granulated much the same as pure sugar would. The eggs laid were not taken care of and the bees finally drifted away. The writer believes that the small number of bees, caused by the smothering of at least half of those introduced, was in part to blame for the failure. With a larger number of bees and more room in the hive, it might have been possible for them to carry through on foundation alone. Time was too limited to repeat the test with more bees and a larger hive, as suggested.

From these experiments it can be seen that young bees are able to carry on all of the duties in the hive without the aid of any old bees. They went into the field earlier than usual even though a feeder of sugar syrup was provided. It was also demonstrated that they can take food during the first day or two without being fed by old bees, as has been held by a few writers. In both of the first two experiments good, strong observation colonies resulted and honey was stored in the observation hive. In the last test the bees finally all dwindled away, but the writer feels that a larger hive and more young bees might produce different results.

Justice Among the Animal Kingdom

By P. B. Prior

Shakespeare found "tongues in trees, books in the running brooks, sermons in stones, and good in everything." What a moral he would have extracted from a recent publication of the British Beekeepers' Association!

The whole document, very official and unromantic in its language, is full of interest for those who look at the matter not merely from the beekeeper's point of view.

For example, it is interesting and even amusing to find the officials insisting that if we sell a hive, the colony, say of ten combs, shall have not only an egg-laying queen, but bees for eight of the combs. These must have their cells charged with brood, and have worker bees in abundance to wait on them.

If we buy bees by weight, we are to have 5,000 to the pound, though the weight may vary from time to time, according to the condition of the bees, whether they are heavy with newly-eaten honey or light from fasting.

Then there must be a guarantee as to the health of all the occupants of the hive, but the certificate is to apply only to the time of sale.

The bees may be sound at the time of selling, but on the morrow they may develop the fatal bee disease. How should that happen? Because the winged insects, being free to come and go as they choose, can invade other hives where disease exists, rob the colony, and return with booty—and with the seeds of death from their victims.

Now, some scholars hold that the greatness of Greece and Rome was ended in some such way as this. Both had mosquitoes of older lineage than Greeks or Romans, but they were innocent and the people remained healthy.

But in time ambition armed masses of soldiers and they went forth to conquer the world. They succeeded, but they brought back with them the germs of tropical disease. Their native mosquitoes bit them, absorbed the germs, spread them from end to end of the land, infesting tens of thousands, and so prepared the fall of the two nations. So we see that the wages of sin are death to man and insect alike.

"Go to the ant, thou sluggard; consider her ways and be wise," said Solomon. And in an ant's nest is a more startling lesson than ever the wise king knew. Industry is not always the guiding force of these insect marvels. They can err as lamentably as men.

As bees take to brigandage, ants take to raiding and slave-making. Once they have done so, they depend entirely on the labor of their slaves, who must fight for their masters as well as feed them.

New Jersey Beekeepers Advertise

The New Jersey Beekeepers' Association has issued a placard in colors showing children being served with honey at the table. The word "Honey" in large letters is followed by the words "Nature's Safe Sweet." This card is available to the members of that association and is designed for display where honey is on sale. Every bit of publicity of this kind helps to move the honey from the grocer's shelves to the consumer's table.

Apiary and residence of A. H. E. Wood, Glassel

Visiting Beekeepers Abroad---*Scotland*

By E. F. Phillips

ON August 12 we took a day train from London right through to Aberdeen and were kept busy all day looking first on one side and then on the other side as we passed things of interest. We arrived in Aberdeen at 10 o'clock that evening, where we were met by Mr. John Anderson, whom all readers of this journal know from his writings, and by Mr. Mardhall Watt, whom they should all know. We went directly to the Anderson home and, like real beekeepers, made a night of it. There was mail to be read from home and plans to discuss, and then, too, we had a lot of mutual friends who had to be talked over. Anderson had attended the London Conference, where he was the life of the party.

In Scotland they have a language on which they pride themselves and which tangles up an American somewhat. When one hears Anderson over there or "Judge" Barr over here using the Scotch dialect it does not sound so strange, for we have all learned to expect queer things from them both, but to hear the two bonny Anderson lassies talking Scotch too was a surprise and a delight. The Aberdonians claim that they are the tightest of all the Scotch and they capitalize stories of their thrift in much the same way that the Ford car gets free advertising from Ford jokes. Mrs. Phillips made something of a hit by telling the Aberdeen beekeepers that the reason why they do not wear rubber heels is because they give too much. Mr. Herrod-Hempsall, who was in Aberdeen just before we arrived, told the beekeepers that their thrift was losing ground, for he had picked up a match box on the street in Aberdeen which contained two unused matches. We have a book of Aberdeen jokes which we shall be glad to loan to any of our visiting friends. But it is all external and the Scotch are in some ways the most extravagant people in all the world in their hospitality. After a little over two weeks in that country among Scotch beekeepers, I am boasting out loud that I am part Scotch myself.

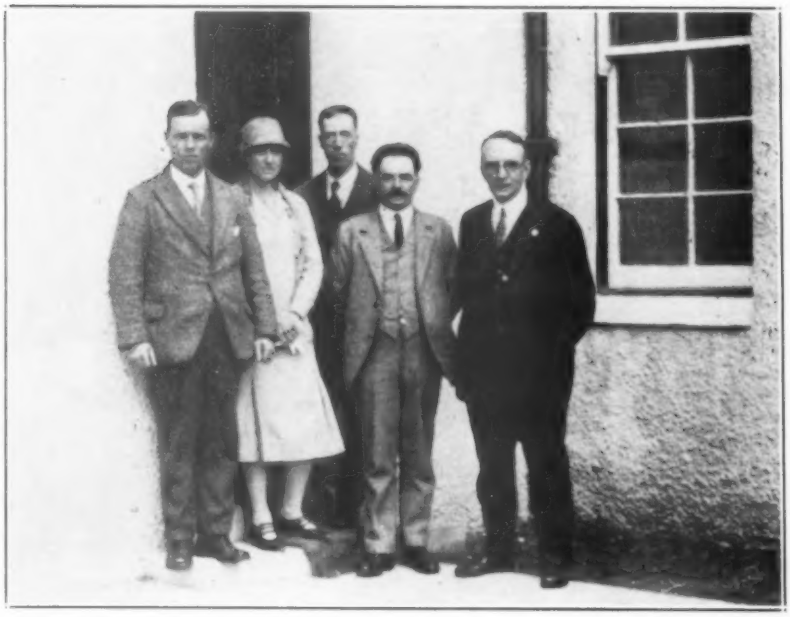
Mr. Leonard Thake giving a demonstration before the Fifeshire Beekeepers' Association

In Aberdeen, besides visiting with the Andersons and Watts, we attended the annual honey show of the Aberdeenshire and Kincardineshire Association, a beautiful display of honey and bee products, arranged chiefly through the labors of Mr. A. H. E. Wood and Miss Nancy Robinson. We attended that evening a banquet given in our honor by the

beekeepers of the region, over which Prof. J. Arthur Thompson, of the University of Aberdeen, presided with a rare skill and tact which we had never seen surpassed on a similar occasion.

We also visited the Caribstone apiary of the College of Agriculture, where we had a delightful, quiet family picnic with the Andersons, the Watts, and Mr. Andrews, who manages the apiary. We saw the sights in and about Aberdeen, went to a vaudeville show where the jokes were largely of American origin, and in short enjoyed every minute in the Granite City. Of course we visited the two colleges of the ancient University.

From Aberdeen we went up Deeside to Glassel, the home of Mr. A. H. E. Wood, whose name is known throughout the beekeeping world because of the fact that the mite causing the Isle of Wight disease is named "woodi," in honor of his help to the investigation. No words of mine can describe Deeside or the estate of Mr. Wood at Glassel, nor can I do justice to his hearty hospitality. He had kindly arranged that Professor Thompson and Dr. John Rennie should also visit his home while we were there, which gave the best possible opportunity for a good, long visit with Dr. Rennie, to talk over his work on the cause of the Isle of Wight disease, and no one could have been more kind than Dr. Rennie in explaining all the points which I raised in our talk. Interspersed with shop talk were delightful automobile rides and other pleasures. The rock garden at Glassel deserves special mention even though I must neglect many other beautiful things on the estate. The rock garden is the largest and finest that we ever saw, and it is doubtful whether its equal exists in all the world. The apiary at Glassel is arranged artistically and skillfully and forms a charming portion of the landscape, while at the same time it is managed with high skill as a real working affair.



Dr. and Mrs. Phillips at the West of Scotland College, Kilmarnock
Left to right—Mr. Hamilton, Lecturer; Mrs. Phillips; Mr. Tinsley, Chief; Dr. Phillips
Back row—Mr. Struthers, Assistant Lecturer

From Glassel we went to Edinburgh. Unfortunately for us, Mr. G. W. Avery, who has charge of the beekeeping work of the college, was absent from the city. So also was Mr. J. W. Moir, founder and present guardian of the beekeeping library of the Scottish association, but we had the pleasure of seeing Mr. Moir in Aberdeen. While we missed these men, we did meet Mr. Cunningham, who is also engaged in the bee work of the college. In Edinburgh we were mainly engaged in being tourists, for there are so many things to see there that every minute was taken. We toured the Scott country to the south of the city and enjoyed it all.

One day we ran up from Edinburgh to Cupar, where we were to attend a field meeting of the Fifeshire society. We were met at the train by Mr. Thake, formerly associated with Mr. F. W. L. Sladen in queen-rearing in Kent, England. He is one of the few in Scotland who are making a living solely from the bees and seems to be doing well with it. After an interesting evening with the Thakes and some other bee folks, we went the next morning to St. Andrews, the home of golf and the seat of an ancient university. Here we saw the golf courses, visited the university and the ruins of the castle

The birthplace of Robert Burns, near Ayre

The home of Sir Walter Scott, Abbotsford

Part of one of the apiaries at the West of Scotland College, Kilmarnock

and cathedral and saw the city thoroughly under the guidance of Mrs. Thake, who formerly lived there.

That afternoon we attended the field meeting near Cupar, and there was a fine crowd of enthusiastic beekeepers present. Mr. Rollo, secretary of the Scottish association, lives in Cupar and, of course, attended the meeting, and there were beekeepers there from various parts of Scotland. The weather was perfect and we enjoyed the occasion, which was held on the grounds of the beautiful estate of Dr. Lee. The following day the Thakes took us back to Edinburgh by automobile, they being on their way for a holiday into England.

From Edinburgh we went to Glasgow, from which place we were scheduled to sail for home. Glasgow is an industrial city and necessarily somewhat less attractive than the other two Scottish cities that we visited, but we enjoyed it, found the apiary at the college with the men in charge, visited book shops and spent a pleasant day.

On the afternoon of the second day there we went to Kilmarnock, where the West of Scotland College of Agriculture is located and where Mr. Joseph Tinsley is in charge of the bee work. He met us at the depot and took us to his home, but within a few minutes we started out on a Burns tour to the south. "Bobbie" was born and lived much of his life in and about Ayr, and that is a favorite tour for many Americans. We were fortunate above the others, however, in that we were accompanied by real Burns enthusiasts, as for that matter almost all the Scotch are, and we saw many things which I am sure the average tourist must miss.

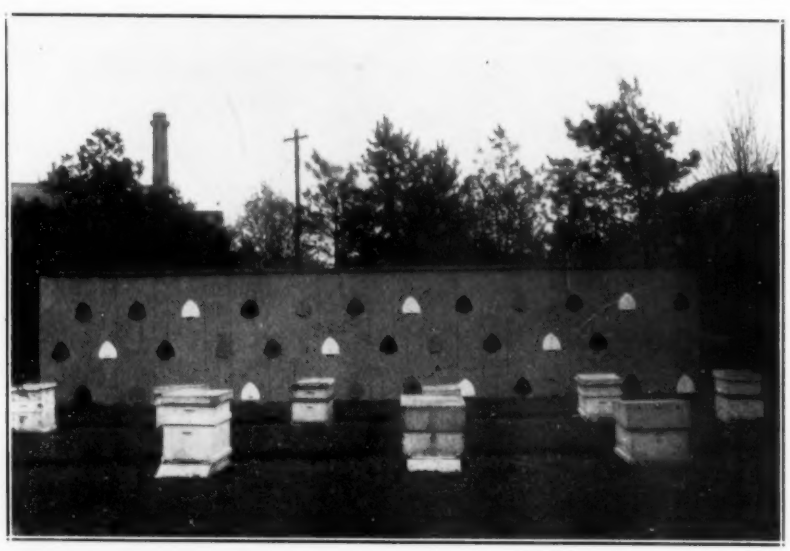
The following day the College of Agriculture held a field day in our honor, and bee men and women came from all parts of Scotland and some from England. The crowd was large and enthusiastic and every detail had been planned by Mr. Tinsley and his associates. It was wonderfully managed throughout. It was our last full day in Scotland and before leaving, so it was a farewell for our trip. Of course we could not fail to appreciate not only the thoughtfulness of the college authorities in arranging such an event for our delight, but also the attendance of so large a number of beekeepers. Talks in the morning and demonstrations in the afternoon in the beautiful apiary of the college made up most of the day, except for perhaps the most delightful part, the personal chats with the beekeepers.

That evening we drove to Glasgow, and in the evening an informal party gathered at the hotel to say goodbye to us. Mr. and Mrs. Anderson were from Aberdeen, Mr. Morgan (editor of the Bee World) from London, and Mr. Lee of the firm of Lee in England.

The next morning we took a train for Greenock, from which point we were to embark. The Andersons and Mr. Morgan were there to say the last farewells, so that up to the last minute before the train left we were among friends. The rest of the trip home was just the sort of trip that several hundred thousand other Americans had this summer.

On leaving Scotland, just as when leaving Switzerland, France and England, we felt that we were leaving behind us real friends. I have met a lot of Scotchmen on this side of whom I am fond, but I never knew before that they come by it naturally and honestly. Beekeeping in Scotland is growing nicely and is under excellent guidance, so that we shall hear more from them soon, but we should remember when reading about their beekeeping that there are some fine, kind and warm-hearted people over there keeping bees, and that they know a lot more about what we are doing than we have known of their affairs.

Some day when the purse has recovered from the strain of the summer trip, we plan again to visit Scotland, England, France and Switzerland. After such a glorious trip as we had, there would seem room for few, if any, regrets, but on leaving we had many of them. We regretted most of all to leave those whom we had met; we regretted that we could not stay longer in each of the countries visited; we regretted that we could not extend the trip to other



Shed holding seven colonies. Experiments being conducted in color and also in wintering. West of Scotland College

countries where we have no doubt there are also fine people keeping bees and where there is much to learn about beekeeping. Perhaps most of all we regret that we did not take this trip twenty years ago, for all this time we have lacked the pleasure which we now have in looking back over the most marvelous summer which we have ever had. We have missed an intimate acquaintance with these fine people, and never before have we been quite so able to understand the problems with which they are faced and the ways in which they are solving them. There are many regrets about such a trip, but there are many joys as well, and some day we hope to remedy some of the deficiencies necessary on a short trip such as we had. I wish that all the readers of this journal might have as good a trip, but I should not want to be responsible for directing such a crowd through Europe. It was hard enough with a wife and six pieces of baggage.

Disease Control In Michigan

By H. M. Krebs

THE battle against American foulbrood in the state of Michigan is continuing unabated. Considerable work was done in this state during 1926 and we consider the results were very satisfactory. We are working under the area clean-up plan and thoroughly believe this is the best plan to use in the eradication of disease. In this plan we have started in the Upper Peninsula and northern counties of the state and are making a complete clean-up in those counties while working towards the south. Work has also been started in the southern row of counties which border on Ohio and Indiana, and we hope that we will soon have the disease hemmed in between those two areas.

During 1926 there were 4,676 yards inspected, and a total of 41,231 colonies. Among this number of yards and colonies were found 1,023 yards and 5,184 colonies that were diseased. The inspectors burned 2,295 and treated 327 of the diseased colonies. The balance of the diseased colonies were either burned or treated by the beekeepers themselves, as all yards are given a second inspection as soon after the time limit as possible to make sure that no disease is left over the winter.

The following figures will prove that all beekeepers have not gotten away from the old-time beekeeping methods: Thirty-two hundred and fifty-six colonies were found to be in crossed combs or box hives during the year. Of this number, inspectors destroyed 348 and transferred 180 colonies. Practically all of the balance were either transferred or destroyed by the owners, with the exception of some that were found too late in the season so that transferring could not be successfully done. These colonies were allowed to remain until next spring, when they were found to be in a clean area.

More or less work was done in sixty-six counties in the state this past year. Six counties that were started in 1925 were completed in 1926. Eighteen new counties were started this year, of which eleven were given a complete inspection and two or three of the remaining seven were nearly completed. We now have twenty-three counties in the state which are entirely free from disease and fifteen others which are free with the exception of a few yards.

The work in the state has progressed to the point where we are now getting practically perfect cooperation from the beekeepers. There are naturally a few cases in which this is not true, but the reception received at the present time is considerably different than it was three or four years ago.

From the figures given above it will be seen that the percentage of yards which were found diseased was 21.9 per cent and the percentage of colonies diseased was 12.6 per cent. This figure is lower than any previous year, probably due to the fact that some counties which were inspected this year were found clean or practically so. Another reason for the seeming size of these figures is that, in counties which have been given one or more complete inspections, only the diseased areas are inspected. That necessarily tends to make the foregoing figures higher than would probably be the case if entirely new territory were inspected and only those figures used.

We do not know that we have ever seen in print any figures as regards the cost of inspection per colony. Our cost per colony for the past year was slightly less than 31 cents, which we believe to be a fair figure for that work. In arriving at this figure all money used by the department for this work, such as salary, expenses and supplies for inspectors, stenographer, clerical help, etc., were all included.

It is expected that the work in Michigan will proceed again next year with more rapidity than it has at any time in the past. We hope to have two-thirds of the Lower Peninsula of Michigan under the clean-up area at that time.

Creosote on Hives

Not long ago one of our readers enquired as to the value of creosote for preserving hives and as to its desirability for such a purpose. Our knowledge of this material is nil. But we find in the British Bee Journal the following concerning this material:

"The busy season being over, and having a little leisure, I revert to this subject, as now beekeepers will be occupied with the renovation and painting of hives, etc.

"I again issue the warning: 'Do not use creosote for hive painting, unless you are seeking trouble.' In the first place, there is no standard for creosote, it is as variable in its strength and constituents as the British climate; therefore there is great danger attending its use. It was known to beekeepers as far back as 1899, but not as a preservative for hives. In 'The British Bee Journal' of July 20, of that year, we read: 'Creosote.—A little of this is usually added to a sponge steeped in strong carbolic acid solution, and used in similar fashion to an ordinary bee-smoker.' This referred to a new subjugator, introduced in that year, for administering carbolic acid and creosote fumes to the bees, instead of smoke, to subjugate them.

"To be effective, creosote should be forced right into the wood under pressure, as is done with railway sleepers. The beekeeper cannot do this, but has perforce to apply it to the surface of the wood with a brush, and during the process the greater part runs off onto the ground; only a very small portion soaks into the wood, and that little but skin deep. It has the immediate effect of opening the pores of the wood, causing the surface to become like a sponge, so that it absorbs moisture, and therefore not only defeats the object for which it is used but actually has a pernicious effect. If one watches creosoted boards when the rain is beating on them, it will be observed that each spot as it falls is absorbed in the same manner that it would be by blotting paper."

Miss Fischer to Medina

Miss Melitta Fischer, who is well known because of her attempts to popularize honey through the Honey tea-room at Madison, Wisconsin, has sold her business in that city and entered the employ of the A. I. Root Company. She will give her entire time to spreading information concerning the uses of honey.

Personal Recollections of the Editor

MY BOYHOOD DAYS—No. 2

IN my first article I mentioned my father's departure for America and the reasons for it. He left in April, 1863, went to Hancock county, Illinois, where he had a friend residing, and busied himself with the purchase of a little brush farm and the building of a loghouse. Land was cheap then, in this state.

Meanwhile, his wife and children had left the old city to take up their home at my grandfather's, waiting for the signal to come to America. I was directed to study the English language. I did so. But one can easily imagine the little achievement that a boy of 12 could make, learning a language out of books, without any instructions upon how to pronounce it. Nothing could indicate to me, for instance, that the "ing" of English was to be pronounced exactly as the "igne" of the French language. No amount of study could explain to me that what is called "the accent" in English is just a swallowing up of letters. For instance, I could not realize that when I tried to say "Hamilton" I should pronounce it "Hamltn." But there is no end to the differences existing between languages, even between English and American words.

While at my grandfather's, during that summer, I often accompanied him on his trips as "official physician" of the district. We would start in the morning, in his two-wheel dog-cart, stop at a village, and there he would call upon the village drummer-boy and entrust him with a proclamation announcing that the district physician was at the village town-hall and would immediately vaccinate all the children brought to him. This proclamation was read at the street corners, after a few beats of the drum, and immediately one would see the village mothers, carrying their babies, direct their steps to the town-hall. Here it was my part of the work to enter the name, age and sex of each child in a record book as soon as they were vaccinated. This vaccination was a compulsory operation, ordained by law. It was only in this way that smallpox was entirely overcome in the villages of Europe.

In the last days of September, my father having written us that he now had a home ready near the Mississippi River, in western Illinois, my mother packed her trunks and we started for the unknown land across the seas. At Havre we boarded a channel boat which took us to Southampton. There we found a German emigrant ship, the "Bremen," upon which we made the voyage to New York City, in fourteen days. We are often told nowadays that immigration to the United States must be stopped, because of the low grade of the immigrants who now seek a home in this country. If those who talk in this way could have seen the class of German immigrants with whom we came, they would acknowledge that no coarser immigrants can be seen now. Yet all the immigrants were welcome at that time, except the actual criminals, and they made good citizens, for their children were soon instructed in American ways. This country had only about thirty-five million inhabitants at that time and the people of the country were glad to see them come. The fact that a few foreign-born acted as traitors during the Great War has caused the anti-foreign feeling.

We arrived during the Civil War, at the worst time of it. But the country north of the Mason and Dixon line was about as quiet as ever. Yet there was a depression in money values, and the few dollars we brought with us were exchanged for two and a half times their value in depreciated greenbacks. That is to say, a hundred dollars in gold brought $250 in paper. But this increase in numbers of dollars did not increase the purchasing power of the money. We were then, in this country, in a position similar to that of several countries of Europe today. Our paper money was depreciated. Yet endless arguments were raised by people who thought the gold had gone up in price, and, shortly after the war, the Greenback party and later the Free Silver party tried to induce the people to make a cheaper money. France and Italy have cheap money now, but it does not make them any richer.

After three days of travel on the railroad, we finally landed at Hamilton, right next to the slough, which, at first sight, I mistook for the great Mississippi, and it appeared to me just about as I had figured it in my imagination, a stream some 300 feet across, with dead trees along its muddy shores. But in a few minutes I was disabused, for we ascended the hill and then saw this magnificent river in its beauty, almost equal to a lake.

We soon found ourselves happily located in the loghouse which my father had built on the little brush farm of forty acres.

A loghouse! I can hear some of our young fellows laughing with scorn at the idea of anyone finding life happy in a loghouse, without a good furnace in the basement, without a bathroom, without sanitary facilities, plumbing, hot and cold water, etc. Boys, there was no happier time in my life than when I lived in that loghouse, when we had to bring water from the spring, or pump it out of a cistern; when we had to use an ordinary washtub for a bathtub; when our cellar was just a hole in the ground. But the woods were right there, with all sorts of game; the prairie chickens covered the prairie and would occasionally alight upon our roof, in snow time. I lived in that loghouse fifteen years. Can you think of anything better than living in such a place with a young, blushing, smiling bride, who was herself reared in such a house and was willing to take her share of the work and hustle around and help make things comfortable? Every improvement, every change for the better is due to our own effort, and we appreciate things best when we have to work to earn them, one at a time.

But I am anticipating on my story. My greatest disappointment in landing on that little brush farm was in the nuts that I discovered. I had been accustomed to what are called "English walnuts." We had them in France; they are common all over Europe. How could a boy enjoy those hickorynuts, hard as stones and almost impossible to break so as to get any of their meat? And the black walnuts! smelling almost as bad as a skunk?

We did not get any bees at first. It was only in the month of May of the next year that my father secured two box-hives, from a friend. He soon transferred them into some Debeauvoys hives which he made himself. But there was nothing of interest in his first year of beekeeping. He planted grapes, Delaware grapes, and they were winter killed the very following winter.

We were grubbing the timber off our little farm. Can you imagine a European business man and a little college boy digging out oak trees, and those tough hickories with a straight tap-root reaching almost to the antipodes? And the hazel-brush; did you ever mow down hazel-brush with a brush-scythe?

We had to learn how to handle a plow. I remember my great astonishment at finding that, if you wanted the plow to go into the ground, you had to pull up on the handles, while you had to press down on those same handles when you wanted to

bring it out. This was exactly the reverse of all my notions of mechanics.

Well, we grew corn, potatoes, watermelons, for a few years. Meanwhile my father was trying to learn English. He subscribed to the New York Tribune, Horace Greeley's paper, and, with a pocket dictionary, kept digging at the words, until, after a few months, he could read the news, in French, to my mother, out of a paper in the English language. The news was worth while, for the war was still on and it was not until 1865 that the matter was settled.

He also subscribed for the American Agriculturist, and it was in that magazine that he read of Moses Quinby harvesting 22,000 pounds of honey and selling this at 30 cents per pound. This was a revelation for him. He bought Quinby's "Mysteries of Beekeeping," read it and went to work making Quinby hives, to which he transferred his bees. A little later he bought "The Hive and Honey Bee." Then the American Bee Journal was subscribed for and he soon wrote articles for it. Evidently Mr. Wagner, then editor, realized that there was something worth while in this correspondent, for he corrected his Frenchified English and made good reading out of it. It was always a wonder to visitors at our home to find that the senior Dadant butchered the pronunciation of the English language so mercilessly. For instance, he would say "my veef" when he meant "my wife." But he did so well in writing that, when Wagner died, in 1872, he was offered the editorship of the magazine which the Dadants took forty years later, after his death.

Meanwhile, I kept away from the bees, for I dreaded the stings. But I had to help working at them once in a while. However, my greatest pleasure was going fishing at the river, on the rapids, with a little seine thirty feet long, with another boy of my age to help drag it. Never did we come home without fish. I also loved to hunt. This love of hunting has remained in the family and my sons are all interested in a hunting lodge on the river, where, with four other sportsmen, they hunt ducks every fall. It is on an island of 180 acres which they purchased, on the Mississippi, some twenty miles away.

While the Civil War was going on and steadily coming to an end, I was slowly learning the English language, by going to the local school and by running around with the children of my age in the vicinity. I learned American slang (more or less) and American songs. Like the others, I sang about "How the darkeys shouted" and "How the turkeys gobbled," without realizing, until later, that the poor southern farmer was then having a taste of what General Sherman so aptly termed "War is hell."

While hunting squirrels, once, I found a colony of bees in a tree. The hole was some forty feet up, for the tree was large and straight. The neighbor on whose land the tree was located readily granted me permission to cut it. But it was so high up that the combs were all broken in the fall of the tree and the bees so demoralized that not one offered to sting. What we secured was mainly crushed brood, rotten wood and dead bees. That put an end to my bee hunting. Moreover, we were not located where many bee trees could be found, as there never was much heavy timber in our vicinity.

Of my subsequent attempts at managing bees, and of our ultimate success, I will speak in another article.

How the Honey Stunt Was Staged

ANSWERING a query as to how he prepared his honey advertising stunt, as given on page 545 of the November number, Mr. Clifford Muth writes:

"If you remember the hives from the yard that were the most gentle, I advise you to use these for demonstration. I used a window space eight feet wide and three feet deep. The bees mussed up the window considerably, and were I to do it over again I would have a wire cage built to fit inside the window, keeping the bees off the glass.

"I used a two-frame nuclei, with the queen kept in a Miller cage. I did not use smoke at any time. Working in the window, you do not have the opportunity of talking to your audience, so display cards are necessary to tell the story. The first card goes on to say who the demonstrator is, etc. I then pick up a frame of bees and shake it onto a newspaper which has been spread on the floor, fold the paper together and dump the bees into a tin basin. If this is done qiuckly, not a bee will fly. Then with the hands I pick up bees from the basin and start handling the cards while the bees are crawling around up my arm.

"The cards, of the usual kind, tell of the life of the bee, how long they live, how many eggs the queen lays, how the honey is ripened in the hive, what makes different color honeys, and why honey granulates. After these ten or fifteen cards have been shown to the audience, the bees are shaken from the hands and a single bee forced to sting on the arm, showing that the bees really have stingers. Also a special card telling about the stinging of this bee.

"The final card tells about the honey that you offer for sale, whether one-pound or five-pound cans—whatever size it might be. Inside the door you have a young lady with an open jar or can of honey, spreading it on fresh bread, crackers or small biscuits. Your card should read that they should come in and try a sample of your delicious honey.

"Remember, have a large display; the more pounds you display the more honey you will sell. It is like a produce man told me one time: that the last twenty-five watermelons of a car takes as long to sell as the entire first part, because it does not attract the eye. Our sales this year from the window display have increased considerably over that of previous years, where we used only newspaper advertisements.

"I put this performance through three times a day—noon, 3:00 and 5:00 p. m. I kept the crowd in front of the window as long as I wanted by simply repeating the performance.

"I believe that if something of this nature were put on once or twice a year by local beekeepers in their home town it would go further toward creating a good market for an even greater production than the national advertising newspaper or magazine campaign."

Australian Honey Export Trade

Trade Commissioner J. B. Foster, Melbourne, reports that honey producers throughout Australia have been experiencing difficulty during recent years in finding a market for their product.

With a view to obtaining information on overseas markets, several cooperative distributing companies have joined in a campaign to place the industry on a better footing. It is planned to regulate supplies, to maintain standard of quality by blending, to increase domestic consumption by means of a publicity campaign, and to develop foreign markets.

Australia has a surplus of about 2,440,000 pounds annually. Exports during the fiscal year 1924-1925 amounted to only 136,640 pounds, the bulk going to United Kingdom points. Domestic consumption is placed at one pound per capita.

Bees as Pollen Distributors

By A. H. Hendrickson, Division of Pomology, University of California

IN spite of the fact that the value of the honeybee in distributing pollen has been demonstrated and emphasized by early investigators and writers, this question seems to be one of never-ending interest to the fruit industry from the production standpoint.

Necessity of cross-fertilization, which in turn depends upon pollen distribution between different varieties and species of plants, was pointed out by such men as Thomas Andrew Knight and Conrad Sprengel as early as the seventeenth century. Later Darwin emphasized the necessity of cross-fertilization. These men thought of the problem from the standpoint of the plant breeder who was interested in securing viable seeds to perpetuate the existing plants or to secure new ones. Later, in our own country, men like Bailey, Waite, Waugh, and others, showed the necessity of cross-fertilization in order to secure profitable crops of fruit without special reference to the kind and number of seeds produced. Since that time it has definitely been shown that there is a definite relation between the seed content and the number of fruits produced. Unfertilized seeds, generally, do not develop, and in such cases a heavy "June Drop" follows.

As early as 1884, Government reports called attention to marked results from the use of bees in California. From such widely separated points as Vacaville and Visalia confirmation was secured of the immense value of bees in causing heavy crops of fruit to set. Following this period there seems to have been a time when the grower was confronted with other problems, at least no mention of further experiments on pollination is to be found in the literature on the subject.

In the meantime large acreages had been set out to fruit. Very often considerable areas were planted to a single kind of fruit which blossomed at the same time. In the development of an orchard section the planting of other crops which serve as pasturage for bees was much reduced. In time there came to be a scarcity, both of wild and tame bees. Furthermore, the average fruit grower does not understand how to keep bees. After a few experiences with foulbrood and other bee diseases, most growers generally give up trying to keep bees.

Apple, a great source of stimulation in many places where apples are grown in abundance

The shape of the blossoms of most deciduous fruits and the manner in which they open is not conducive to self-pollination. The stigma or receptive organ is often ready for pollination before the pollen is ripe. Consequently, the pollen from any given flower must be transferred to another blossom which opened several days later, to be effective. Furthermore, the positions of the male and female organs are such that pollination within a single flower is unlikely, unless it is brought about by insect visitation.

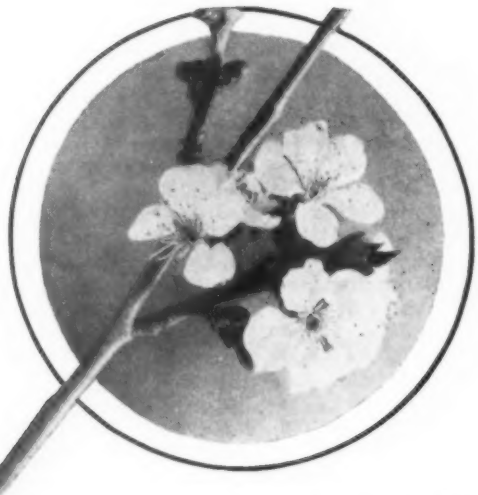
Finally, the weather is an important factor in the pollination of blossoms. Cold, rainy weather is generally believed to be unfavorable because bees remain in the hives. On the other hand, the weather may be too warm to bring about best results. In seasons when the temperature is high during the blossoming season, all the flowers seem to open at once. Pollination must take place within a few days, but under conditions where the blossoms open rapidly this is often impossible. I have seen cases where the blossoming season was so short that it was obviously impossible for all the insects present to visit more than a comparatively small percentage of the blossoms. The crop during such seasons was usually very light.

In connection with the general problem of pollination being carried on by the University of California work was started in 1916 to determine the value of honeybees in carrying pollen. The work was done on prunes and the decisive results obtained showed that the honeybee was an important factor in the distribution of pollen. The experiments were repeated first in 1917, and later in 1921 and 1922, with different varieties of shipping plums. These results are so well known that it doesn't seem necessary to repeat them before this audience. For those who are interested, I might add that bulletins containing a detailed account of these experiments may be obtained upon application to the Dean of the College of Agriculture at Berkeley. These experiments have been repeated in many eastern experiments, notably Michigan, where remarkable results were obtained with the J. H. Hale peach, which is often a very shy bearer.

Following the California experiments many growers installed bees in their orchards during the blossoming season. In practically every case the results were very gratifying from the standpoint of increased yield. Yield records are not generally kept by fruit growers, so it is hard to estimate the actual benefits derived from the use of bees in orchards. However, I did find a few cases in which the growers were able to give me a record of their orchards before and after bees were used. Some of these records were presented before this society a few years ago and may be found in "Gleanings in Bee Culture," Vol. 50, April, 1922.

The number of colonies of bees to use in an orchard is one of the problems on which, until recently, we have not had much information. Some of the older books suggested the use of one colony to the acre. Professor Tufts recommended for deciduous fruits in California one hive for each acre, assuming that fairly strong colonies were used. A

Pear. Many varieties are self-sterile



Cherry. The bee is its most efficient pollenizing agent

Peach. Too heavy a set of fruit means costly thinning in a peach orchard.

Plum. Attracts a great variety of wild bees

recent publication by the New Jersey Experiment Station indicates that the use of one hive per acre is approximately the right number. In these experiments it was found that when all the trees in the orchard were in blossom the bees did not fly more than about 100 yards from the hive. On this basis the author recommends that four or five colonies be placed together at one place and that these bee stations be placed at intervals of about 150 or 200 yards apart. He believes this to be a better plan than placing twelve or fifteen colonies at greater intervals. A few years ago I observed a striking example of not distributing the bees uniformly over the area to be pollinated. In a 30-acre prune orchard about fifteen or twenty colonies were placed on one side of the orchard and about the same number on the opposite side. The trees near the hives were loaded to the breaking point, while about half way through the orchard there was a strip of trees that produced practically no fruit.

Thus far we have discussed that portion of the problem of pollination on which both the beekeeper and the grower agree. On some of the remaining phases there are, unfortunately, disagreements which sometimes reach the stage of threatening to have "the law" on one another. The most serious causes for disagreement lie in the prevalence of and the control measures for certain plant diseases. In general the bees are accused of spreading disease on the one hand, and the growers, on the other hand, of killing bees by spraying with arsenicals. There may be some justification in both accusations. It would seem profitable then to take time to inquire further into these complaints.

Bees have long been charged with spreading fire blight in pear and apple districts where this disease is present. The contention has been that the bees first visit diseased trees and then move to blossoms on healthy ones. Undoubtedly this is true. Other insects do the same thing, and those which are known to puncture young succulent growths and to also feed upon the exudate of the old holdover blight cankers are probably worse offenders than the bee, which seems to do neither. The Ohio Experiment Station (Bulletin 357, March, 1922,) carried on a number of experiments on the dissemination of blight in Ohio and seemed to find that rain was perhaps more harmful in spreading blight than bees. Their findings may not apply to California, where the blossoming season is usually rainless. It was found, furthermore, that if the blight organism was carried to the hive it did not live for more than about seventy-two hours in the honey. But they also found that the blight organism could live for about ten days in the honeydew from plant lice. Various sucking insects, after feeding upon this honeydew, were found to carry the disease organism. On the whole, the experiment as reported seemed to show that the bee was not entirely responsible for the spread of this disease. On the other hand, there was a serious outbreak of pear blight in one section of California which is ordinarily quite free from this disease. A number of stands of bees had been imported for use in one of the orchards during the blossoming season from a section where pear blight was known to exist. It is needless to add that the growers were convinced that the disease had been brought in by the "outside" bees, and strongly urged that no more bees be brought in from diseased areas. Similar situations may easily be avoided if bee men would not move bees from one pear district where blight exists to another which is usually free from this trouble. It occurs to me that, if bees for use in the central coast valleys could be brought in from the alfalfa or sage pastures, there would be no further trouble from this source.

The spraying of fruit trees with arsenicals when in full bloom is a practice which concerns both the beekeeper and the grower. The former suffers from the death of his bees, and the latter from the lack of pollination, because if the bees are killed they cannot distribute the pollen. Beekeepers have long maintained that spraying with arsenicals in full bloom killed bees, and recently a Government report (U. S. D. A. Bulletin 1364) has shown that this contention is correct. A great deal of this full bloom spraying is probably done by careless or thoughtless persons. Experiment stations throughout the country have repeatedly demonstrated that control of such insects as the codling moth can best be effected by spraying just before the buds open and again after the petals fall. Spraying at these stages does not injure bees. While laws have been passed in a number of states prohibiting spraying in full bloom, many difficulties seem to enter into its proper enforcement. This question seems to be one that can probably best be solved by education. The Divisions of Entomology and Pomology of the University of California are doing all they can to educate the grower to spray at the right time.

From the standpoint of the grower some fruits need cross-pollination to secure satisfactory crops, while with others additional pollination might be a liability instead of an asset. It is doubtful if it would pay the grower to provide bees for pollinating the apricot and most varieties of peaches. With both of these fruits, if weather conditions are favorable, the set is ordinarily so heavy that a considerable expense is incurred for thinning. Hence, a still greater set would not be desirable. With cherries, great benefits may be derived from the use of bees in orchards. The same is true for almonds, Japanese plums and some varieties of European plums. French and sugar prunes, while self-fertile, are often aided in setting crops. The Imperial prune usually requires cross-pollination. With apples the question regarding the use of bees will depend upon the section. In some places, with certain varieties, the set is sufficient without bees; in others, bees are absolutely essential. While many pear varieties are self-sterile and are benefited by cross-pollination, in some districts this fruit is able to set crops without fertilization. In other districts the use of bees will probably be advocated or frowned upon according to the prevalence and severity of blight.

(Merrill, at the Kansas Experiment Station, shows that aphids are the principal agents for the spread of blight. See American Bee Journal, June, 1916, page 202.—Editor.)

Austrian Market For Honey

Austria, with a highly developed bee-raising industry, is able to produce about two-thirds of its requirements for domestic consumption, according to Vice Consul G. Teall, Vienna. Austrian honey production for the year 1925, the latest year for which statistics are available, amounted to 1,877,778 pounds, as against a five-year production of 1,592,231 pounds. Consumption demands call for about 2,646,000 pounds per annum, the difference between consumption and production being imported from Yugoslavia, United States, Rumania, Cuba, and Mexico, in the order named, for the year 1925. For the first six months of 1926 the relative importance of sources of supply changed to Hungary, Rumania, Chile, United States and Yugoslavia, in the order named.

Honey In New York

A recent issue of the Cobleskill Times gives front page space to a two-column story about the business of honey production in that county. Mention is made of the prominent beekeepers who formerly lived in that region—Moses Quinby, Captain Hetherington, and E. W. Alexander. The story appeared in connection with an account of meetings of beekeepers addressed by George H. Rea.

Water For Bees

By Newman I. Lyle

THAT bees need water is acknowledged by all writers on beekeeping and by beekeepers generally. However, I wonder if the majority of beekeepers realize how much water is required to carry on the work of the hive. Reports of quantity used vary, caused, no doubt, by the condition of the bees at the time of observation, also by natural water supply.

During the last three years of dry weather, especially the last two of local drouth, the water troughs needed daily filling. I discovered one hundred colonies used as much as six gallons of water daily—a cupful or one-half pint per colony. A good dew cut the quantity of water consumed approximately one-half; also for a few days after a rain no water was used from the waterer. Through this time of drouth there was a steady yield of from three to six pounds of honey daily from sweet clover, enough to keep up brood rearing through the dryest weather on record for northwest Iowa, and produce an average of one hundred pounds per colony surplus.

At first I used pig troughs of the V type, with floats constructed of lath, paraffined so they would not waterlog. The laths were spaced one-fourth (¼) inch apart with an old strap or piece of inner tube; this made a flexible float that would always remain on top and settle evenly. I found this very good for a yard of ten colonies or a home yard where it could be filled daily.

On establishing outyards I found the best locations lacked a natural water supply. Complaints began to come in about the bees bothering chickens, livestock, and even the hired man. Something **had** to be done or they might sting the hired girl! The trough waterers would not do, as a beekeeper is too busy to make a round of his outyards and water bees every morning.

The Improved Bee Waterer was developed as a saver of labor and friends. This consisted of a galvanized steel trough four feet long, ten inches wide and eight inches deep (4' x 10" x 8"), average cost from the tinner about two dollars and fifty cents ($2.50).

This is set level and filled with water, a lath float made as previously described is placed in the trough. Then a reservoir was added, consisting of a steel oil drum set on blocks so the smaller hole is above the rim of the trough. A short piece of pipe, about two inches long, called a nipple, is screwed in the small hole; an elbow is screwed on that, turned down, and another nipple extends from that into the trough.

The depth of the water in the trough is regulated by the position and length of the lower nipple. To fill the waterer, plug the pipe (a cob does very well), fill the drum through the large opening. Screw on the cap tight, using a good gasket, remove the plug from the pipe, and there is water enough for a week of the worst drouth Dakota or Iowa can muster, for 125 colonies with a real thirst.

The watering device in action

If the bees do not start using water immediately, sprinkle a couple handfuls of salt on the float, as they like salty water; this will usually start them.

List of materials and approximate cost:

One steel oil drum, 55 gallon capacity	$1.50
One steel trough 4' x 10" x 8"	2.50
One packing for large plug	.10
One elbow	.25
Two nipples	.20
Five lath	.10
Total cost	$4.65

The reason for using the galvanized steel trough in preference to wood is that the wood trough will warp and lose part of the water.

Wash the oil drum with kerosene to remove old oil, then wash again a couple of times with strong lye water, boiling hot, and rinse with clear water several times.

Iowa.

Ontario Honey

Consul E. Sauer, Toronto, Ontario, Canada, under date of December 26, 1926, reports that the local press states that 90 per cent of the record honey crop of 1926 had been disposed of and that the co-operative marketing branch of the Ontario Beekeepers' Association had been keeping the marketing problem well in hand. A report submitted to the annual meeting of the association indicated that new markets for Ontario honey had been established in Europe with prospects of regular avenues of sale in certain countries there. The 1925 crop is reported to have netted two cents per pound less than the 1924 crop, one cent a pound being chargeable to increased marketing expense.

The 1926 crop is reported very light, due, first, to the fact that 50 per cent of the bees are said to have been killed by the heavy frosts of the winter of 1925-26, and, second, to the very rainy season of 1926.

Good Prospects

The 1927 honey outlook in the Intermountain States is excellent, according to opinion expressed recently by Earl J. Miller, Provo, Utah, of N. E. Miller & Sons Company, extensive intermountain honey producers.

Mr. Miller stopped at Salt Lake City on his way to Blackfoot, Idaho, where the Miller company has apiaries.

Recent rains in California assure a good honeyflow, which will please the Millers. They have bees in San Bernardino county. Reports from Idaho indicate bees in that state have wintered well. Glen Perrins.

Bulletin On Sweet Clover

The Illinois Experiment Station at Urbana has recently issued a bulletin on handling sweet clover. This bulletin deals especially with the use of this crop for soil improvement. In view of the great interest in sweet clover there is likely to be an extended demand for the bulletin. Those interested should write directly to the station and ask for Bulletin 285 by Albert Whiting and Thomas E. Richmond.

Roadside Selling Contest

To stimulate interest in roadside selling of honey, the A. I. Root Company offers prizes of $150 in cash and twenty-five "Honey for Sale" signs for the best photographs of roadside stands, with articles describing methods of selling. The contest closes October 15, at which time all photos and articles must be in.

Southwestern Honey Plants

By Frank C. Pellett

The Mountain Lilacs

THERE are about forty species of shrubs which belong to the genus Ceanothus common to the Pacific Coast region, from British Columbia to Mexico. They are free blooming, with small flowers in dense clusters. Some species, like **Ceanothus Arborea,** which is shown in the picture, have flower clusters somewhat resembling the garden lilac, which probably accounts for the name. A long list of common names might be included to describe the plants as known in various communities.

A few species belonging to the same group are to be found in the eastern states. The New Jersey Tea is the best known of the eastern varieties. It is found from New England and Ontario to Manitoba and south to Texas and Florida. Like the others of the group, it yields nectar freely and is very attractive to the bees. Because there are few localities where the plant grows in sufficient abundance, it is valuable only as a minor source of nectar, of some help in spring brood rearing.

In the Rocky Mountain region there are several species of Ceanothus. Snow brush **(C. velutinus)** is found from South Dakota and Montana to California and British Columbia. It is common in western Washington, where it is known as Fragrant Laurel. It is regarded in some places as an important source of nectar in early summer.

Mahala mats, or Squaw Carpets **(C. prostratus),** is a trailing form whose branches root freely as they spread over the ground, thus forming mats. The blue flowers appear in May and June and are followed by red berries. It is reported as of considerable importance, in the vicinity of Seattle, by Stephen Harmeling.

From southern Washington south to central California we find **Ceanothus cuneatus,** commonly called buckbrush. Every locality has its shrub which is known as buckbrush. Many different things are known by that name and several of them are important sources of nectar. This California Ceanothus, known as buckbrush, grows on the dry, rocky slopes of mountains and foothills and offers attractive pasture for the bees in early spring. The blossoms and leaves of this species are also shown in the picture herewith.

This group of shrubs, which is so widely distributed from Canada to Mexico and from the Atlantic to the Pacific, is everywhere of value to the beekeeper. The bloom, though small in size, is profuse in quantity and the flowers are rich in nectar. Some species is to be found under almost any conditions where shrubs will grow. From the high Sierra Nevada Mountains, where the snowbrush **(C. velutina)** is found at far heights, to southern Alabama, where the red-

Mountain lilac, Ceanothus arborea

root **(C. americanus)** grows in open woods, the bees seek the nectar from these plants.

The honey is variously reported as white and light amber color, but generally of good quality.

Several species have attracted the attention of the landscape gardeners

Buckbrush, Ceanothus cuneatus

and are now planted as ornamentals. Because of the attraction of the bloom, their use is likely to increase and we may expect to find them in parks, cemeteries and about the homes of flower lovers generally.

The Buckthorns

Another widely distributed group which is important to the beekeeper is buckthorn. The buckthorns are closely related to Ceanothus and are famous for their attraction to the bees.

In California there are three species, all good sources of nectar. The one shown in the picture is commonly called redberry **(Rhamnus crocea).** It is found near the coast, blooming in early spring, and is of special importance to stimulate early breeding. It is a low, much-branched, tree-like shrub. The picture shows the small flowers in clusters. It gets its name from the bright red fruit. It is also sometimes called California Mountain Holly.

Cascara Sagrada **(Rhamnus purshiana)** is a small tree with a black berry. It grows from British Columbia to California. The bark is extensively used in the drug trade. Several million pounds are thus used each year, with the result that the wild supply is diminishing and there is a probability that it will come into cultivation on a commercial scale. Cascara, made from the bark of this shrub, is a well known laxative which acts on the lower intestine and is a valuable remedy for chronic constipation. Its use is so general that the demand is likely to be permanent, and with the exhaustion of the wild supply cascara sagrada groves must be planted to maintain the supply.

It blooms early, and for that reason is not as well known as a source of surplus honey as would otherwise be the case. Some beekeepers do get surplus from it, however, and those who know the product esteem it highly, although it is dark in color when in the comb. When fully ripened the honey is very thick and difficult to extract. The flow is said to last three or four weeks. The honey has a laxative tendency, although it is not purgative. Some claim that the honey from Cascara Sagrada relieves constipation very effectively. Honey from this source is very slow to granulate. Because of the peculiar properties as well as the pleasing flavor and delightful aroma, customers once acquainted with it are likely to continue to demand cascara honey.

The coffee-berry **(Rhamnus californica)** is an evergreen shrub five or six feet in height, very common in the lower altitudes of the mountain regions near the California coast. It is sometimes called pigeonberry, also California buckthorn and California coffee-tree. It also yields

an amber honey of heavy body and likewise shows some cathartic tendency. The bark of this species is sometimes sold in the markets also.

Eastern beekeepers are familiar with the common buckthorn, which has been introduced from Europe and is used as a hedge plant. It has become naturalized in some localities. There are three or four native species also common to the eastern states from New England to Iowa and southward, all of which may be of more or less value to the bees.

Spring Queen Introduction

C. D. Adams, Chief Apiary Inspector of Wisconsin

Last spring, while inspecting bees in the northern part of Wisconsin, I ran across something new to me in queen introduction. While I have been a constant reader of bee literature for many years, I do not recall ever reading anything similar.

I was inspecting the 450-colony apiary of Charles Giauque, of Stanley. It was about fruit blossom time. The time is the one important factor, according to Mr. Giauque. He had gone over most of the colonies a week before. The bees had not wintered very well, and many of the colonies were weak and some of them had only a queen and a handful of bees, and some had been queenless.

Before going very far in the yard we came to one marked "Queen Introduced." He explained that he had introduced several queens from other colonies. We looked to see if the queen was laying and found her on the job. Soon we came to a row that had not been gone over the week before, and a few of these were queenless. He had marked some colonies that were too weak to build up. When we would come to a queenless colony he would go to one of the weak ones and get the queen and bring her to the colony that needed one. He had carried her in his hand, and with no previous manipulation of any kind he ran her in at the entrance. He did not follow this with smoke.

He explained that he had practiced this for years and seldom had a failure. Before I had finished the yard I think we had found about twenty colonies in which the queen had been "run in" the week before. Of these, just one showed no evidence of a laying queen. I consider this a good showing for any kind of queen introduction.

Mr. Giauque explained that it was only before and during fruit bloom that he practiced this method. He said the queenless colonies at this time are at peace with all the world and will accept a queen under almost any condition. I believe he is right, for I think most of us have found that bees are not cross at this time of the year. I often inspect bees at this time of the year without a veil, and use very little smoke. Later I often find the same apiary difficult to handle even during a honeyflow.

If the queen can be introduced so easily at this time of the year, it will simplify matters considerably for the man with outyards.

(I would be willing to wager that a queen that had been traveling would not be so easily introduced. The reason of the ready acceptance of a such a queen is that she has just been removed from a colony and is in fine laying condition. The difficulty lies in introducing a queen that has been traveling in a cage for several days.—Editor.)

Redberry. Rhamnus Crocea

Sweet Clover and Bees In North Dakota

The nineteenth biennial report of the Commissioner of Agriculture and Labor for the state of North Dakota is at hand. This report, among other things, covers the amount of sweet clover sown and the bushels of seed gathered during 1924 and 1925, and also honey produced.

It is interesting to notice that in 1924 there were 214,019 acres of sweet clover sown in the state, and 214,831 bushels of seed gathered.

In 1925 the acreage sown in sweet clover had increased to 315,625 acres and there were gathered in that year 351,046 bushels of seed.

Seven different counties in 1925 had over 15,000 acres of sweet clover sown. These are, in order of amounts, as follows: Ramsey, Walsh, Grand Forks, Cass, Towner, Nelson, Richland. The first two counties, Ramsey and Walsh, had more than 25,000 acres of sweet clover sown.

There were, according to this report, 3,708 colonies of bees in North Dakota in 1925, making a total crop of 206,019 pounds.

In 1926 these had increased to 4,157 colonies, with a total crop of 329,761 pounds.

THE BEEKEEPERS' LOOKOUT

POOR RELATIONS OF THE HONEYBEE

Among the insects, the order hymenoptera includes many of the most interesting forms. In this group we find all stages of development of the social instinct from the small family of a dozen or more individuals, the offspring of a Polistes wasp, to the highly specialized honeybee family with its thousands of members. Bees, wasps, and ants are closely related and have many characteristics in common. They are distributed over a large part of the earth's surface, being more abundant in the warmer regions.

It was something of a surprise when we heard that W. D. Albright was keeping bees in the Peace River country, in northern Canada. When I went up to see what there might be for bees in that north country, Albright gave me another surprise when he took me out to see a colony of yellowjackets. They had built their paper nest on the under side of a fallen tree so that it was very near the ground, as shown in the picture. I have not yet ceased to wonder about the things I saw in the north country. I had no idea that yellowjackets could establish themselves and build up a populous colony in the short summer there. With the coming of winter, the males all die and only the mated females live over, by hibernating in some crevice, where they escape the severe cold.

Instead of feeding their young on pollen and honey like the bees, the yellowjackets are hunters, and kill insects for food. Many a time I have watched them catching houseflies to carry away to feed the larvæ. They thus render a real service and should be encouraged.

Ants

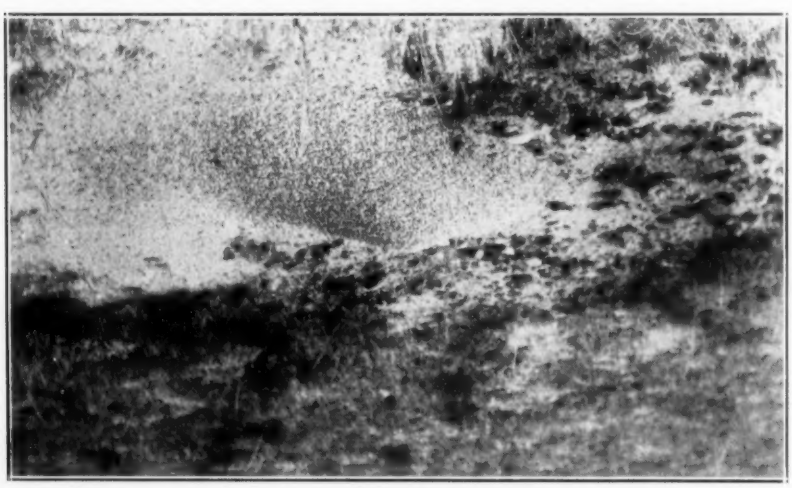
Ants are a never failing source of interest to me. Wherever one goes, north or south or east or west, he finds ants. There are hundreds of different kinds and their colonies range from a small family of a few dozen to immense communities of millions. They seem to be able to adapt themselves to any kind of environment and to overcome great difficulties in establishing and maintaining themselves permanently.

On the dry and barren desert, where little animal life is to be found, there we find ant communities. The photo shows an ant hill on the Wyoming plains. In the mountains, by the sea, wherever you go, you have but to open your eyes to find them near at hand.

Some are hunters and, like the yellowjackets, carry home insects of various kinds for food. Some cultivate mushroom gardens under ground and live from them. Almost anything serves some species of ant for food.

The most amazing ants, however, are the honey-making ants of the southwest, from Colorado to Texas. Like the bees, they gather honey, but, unlike them, they build no combs in which to store it. Instead, they make use of certain members of the community, whose bodies are blown up into a sort of jug. They have somewhat the appearance of a toy balloon with a head on one side. These ants which serve as bottles in which to store the food for the community do not move about, but spend their lives suspended from the roof or side of the cavern in which they live.

It was at the State Apicultural Laboratory, near San Antonio, Texas, that I first saw these insects. H. B. Parks introduced me to honey which was not made by bees, and I could see little difference from bees' honey. Mexican peons seek out the nest and eat it, along with the live jug in which it is contained, with seeming relish.



An ant hill on the Wyoming plains

That Brood Count

By Rev. B. Wright

The reader will please refer to Dr. Merrill's article in the March number, page 136, and my previous article on the same subject. I wish to make a few remarks.

Dr. Merrill says "only a percentage of the eggs which are laid ever develop into brood." I suggest that this state of affairs indicates that there is something wrong with the colony. If in a colony of rats half the young born were regularly eaten by the parents, that would indicate something wrong with the colony from the rats' point of view, anyhow. In the bee colony the queen is able and willing to lay more eggs, the workers eagerly hatch all that are laid and would rear them to perfection, but when the time comes for greatly increased feeding of the larvæ at four and a half or five days from the laying of the eggs a large proportion of them are unnaturally devoured by their sisters; some inhibiting factor prevents the natural completion of the brood rearing, and it is natural to call this inhibiting factor starvation, though it may be found to be something else.

With me, this inhibiting factor does not exist. Under ordinary circumstances, in the brood rearing season and through the harvest flow every egg laid is brought to maturity and the brood is not scattered, as it is when a percentage of young larvæ have been destroyed.

Dr. Merrill mentions that Mr. Sturges also gets these big brood nests. I have not discussed this matter with Mr. Sturges, but I am not surprised that his experience is the same as mine. We both have the same sort of soil, the chalk downs of southern England.

The inhibiting factor is not present here. It is evidently not lack of lime, as I prematurely suggested; it depends, as Dr. Merrill says, on locality, and not on the breed of the queen, and the beekeeper who discovers what it is and how to remedy it will confer a great benefit on the industry.

England.

Newspaper Stuff

A friend in New York sends us a clipping from the New York Tribune of March 9, containing similar stuff to what newspapers usually publish on the honeybee. A Professor Babbitt, of Trinity College, is reported as saying that the honeybee is lazy. They speak of the bee as "he" and it looks as if they might have mistaken the drone for the worker. Why can we not have some correct teachings from the men who ought to be giving information to the public?

Honey Producers' Contract Crop

By Walter L. Clark

THE beekeepers of the Mountain States Honey Producers' Association now have signed for the season between 260 and 270 carloads of honey, which they plan to market collectively.

Before the sign-up is ended it is estimated that 500 carloads with a market value of one million dollars will be pooled. This quantity will furnish an output which will make the association an important factor in the national honey market.

The first president of the association, J. M. Stark, has voiced the above information and states that to familiarize honey producers with the objects of the association a series of meetings will be held in Idaho in the next few weeks, Emmett and Nampa being scheduled for the first meetings.

The formation of the Mountain States Honey Producers' Association is to serve as a co-operative marketing organization for the five states of Wyoming, Colorado, Utah, Montana and Idaho. Headquarters have been opened at Boise, Idaho, to market the rest of the 1926 crop remaining unsold. Arrangements have been made with the Federal Intermediate Credit Bank at Omaha to finance movement of the entire crop for the season by using bonded warehouse receipts on stored supplies as security.

Idaho's ex-Commissioner of Agriculture, Mr. Kjosness, was selected as publicity director of the newly organized western states association, and reports the three-fold success of the organization meeting as being really wonderful in the area represented, the interest and enthusiasm manifested, and in the practical results accomplished. Prior to this united effort by five states, the Intermountain Beekeepers' Association was fuctioning, but the scope of the new organization is much broader and its prospects for successfully marketing the entire honey crop of the Northwest are more marked and far better. Now there will no longer be a half dozen or more associations which wholesale honey buyers could pit against each other for the purpose of price cutting. One great central selling agency will control the placing and the disposition of the entire crop of its members.

The organization will have control of from 500 to 1,000 cars of honey. They plan for a uniform pack and will accept the United States honey grades and federal inspection. The output represents the work of about 20,000 colonies of bees. The value of the product for 1927 will run somewhere between $1,000,000 and $2,000,000, depending upon the season and prices. This is by far the largest honey marketing organization in the world, and the fact that it started with honey producers of the Boise Valley gives a great deal of satisfaction to beekeepers in that section, as well as to the Idaho officers of the association. One of the plans is to establish a bottling plant, probably at the central offices and warehouse, which have not yet been established.

Cost of Erosion—Which Can Be Stopped Often with Sweet Clover

According to H. H. Bennett, of the survey division of the Bureau of Soils, erosion takes $200,000,000 from the pockets of farmers every year. Rushing rainwater, sweeping over the fields, carries away twenty times as much plant food every year as is permanently removed by crops — approximately 126,000,000,000 pounds as compared to only 5,900,000,000 pounds removed by crops.

But this is not the only damage caused by erosion. Millions of tons of rich top soil are carried out to sea annually, leaving a very infertile soil, and more difficult to till. Much of this soil may be carried over rich bottom lands further down the valleys, depositing sand and other inert materials and often ruining crops. Probably not less than 10,000,000 acres of formerly cultivated land have been ruined by rain wash, and not less than 3,000,000 acres of good stream-bottom lands spoiled.

The violent erosion which forms gullies quickly attracts the attention of land owners, but sheet erosion is quietly wasting away the lands of the country and impoverishing farmers on a much vaster scale. Nearly every agricultural county in the country suffers from sheet erosion which takes the rich top soil from gentle and steep slopes. In one instance it was found that seven inches of top soil were removed in twenty-four years from a gently sloping field growing corn under ordinary cultivation.

A quick relief from such loss comes from various forms of hillside terracing, and one of the best plants for this purpose is our own white sweet clover. We can easily sell the value of terracing with it to our farmer friends. It will benefit them and also gradually improve the bee pasture.

Treatment of Stings

By Dr. W. Ray Jones

Regarding my article in the November issue of the American Bee Journal, the dosage of adrenalin was not given, since this is not a drug to be used as a home remedy.

The dosage of a 1:1000 stock solution hypodermically is from three to ten drops for a person weighing 150 pounds. Larger people or children would require proportionately different dosages. Frequency of administration varies from ten minutes up. The drug's effect is very short lived. The better way of giving is repeating the dose every ten or fifteen minutes until results are obtained. In very severe cases of collapse, we sometimes use a long needle and inject the adrenalin directly into the heart itself. The sticking the needle into a person's heart and injecting a drug which in itself could cause no end of trouble are measures only to be used in the extremes.

For emergency use, an ordinary 1½ C. C. Luer syringe with needles and some of the fresh tablets could be kept on hand. The solution could be made quickly from the tablets by dissolving one or two, depending on size, in sterile water. The tablets are never as reliable as fresh stock solution kept in the original bottle.

The drug is dangerous in the cases of high blood pressure. If used injudiciously, some person might develop apoplexy as the result of the treatment.

Report of Iowa State Apiarist

The report of the State Apiarist of Iowa for 1926 is on the writer's desk. It contains eighty-two pages of high-class beekeeping information. Many of the well known writers on bee culture, not only of Iowa but of many states, contribute to its pages. Since the first volume of this series appeared in 1913 it has been much in demand and many libraries carry complete sets of the Iowa report. The present volume is an especially good one and contains several important papers.

Those interested in securing copies should address Prof. F. B. Paddock, State Apiarist, Ames, Iowa.

Bees and Fruit Blossoms

The pollenization of fruit blossoms is treated in a short bulletin, under date of April, 1927, by the Extension Service of the Michigan State College of Agriculture. Although there is nothing very new in this bulletin, it treats of the possibility of the beekeeper renting colonies of bees to the extensive fruit grower. It is interesting from that point of view.

THE EDITOR'S ANSWERS

When stamp is enclosed, the editor will answer questions by mail. Since we have far more questions than we can print in the space available, several months sometimes elapse before answers appear.

DRAWING FOUNDATION

Given two hives of bees of absolutely equal strength in every way and both on good honeyflow; both have all the room for storage they need. If one sheet of foundation or a super full is placed on one, but foundation is entirely left off the other, will the one which it was left off of, store more honey than the one with foundation furnished to it?

Mind you, this is in no way to be confused with two colonies **lacking** storage combs, and one is given full sheets and one drawn combs to store in, but both colonies being allowed storage combs in addition to the foundation given to the one.

In other words, does it cost any honey at all to draw sheets of foundation into combs in a long, good flow? Or, is wax secreted automatically and wasted if foundation is not given to draw under these conditions? LOUISIANA.

Answer.—There is no doubt that wax costs honey to the bees, from seven to twenty pounds. But it is least expensive when there is a crop on, because the bees produce wax whenever their stomach remains full for twenty-four hours or more. However, those who say that this wax is wasted when there are no combs to build do not realize that there is always a lot of wax needed to repair corners, short cells, and to seal such cells as have been filled with honey.

Comb foundation, when weighing about six sheets to the pound, has enough spare wax in it to build the entire comb. The Foloppe brothers, in France, made the experiment of coloring beeswax in foundation so as to find how much of it was drawn out, and stated that the wax foundation of that weight or thereabout would be heavy enough to supply the entire comb, if the bees are not too much hurried with honey coming in fast.

The only time when I have seen any quantity of wax dropped on the floor is when they have to build all the combs, because then there is a large amount of wax produced and therefore more occasions of dropping scales to the floor.

NICKEL LINING FOR EXTRACTOR. GOLDEN ITALIANS

1. I have made a honey extractor and used zinc for the can; it is nickled on the inside. I have been told by a friend that it would poison the honey. Do you think it would be safe to extract in?

2. Are the leather-colored Italian bees better than the golden Italian? If so, what are their advantages? KENTUCKY.

Answers.—1. This question was sent to Mr. James I. Hambleton, the United States Apiarist at Washington. He writes us as follows:

"You can safely inform your beekeeper friend that he need not have any fear whatever that the use of an extractor which is nickeled inside will poison the honey. Nickel is much less affected by honey than is the ordinary galvanizing.

"Nickel plating, if not directly on the iron or steel, without a preliminary coating of copper, does not form an absolutely complete coating on the iron, but leaves minute holes through the nickel coating, which, though invisible to the eye, do permit the entrance of moisture, causing the iron to rust, finally resulting in the scaling off of the nickel coating, as you may have observed on the handlebars of old bicycles, etc. A thin preliminary coating of copper, deposited on the iron, makes a connection between the iron and the nickel which results in a perfect nickel coating. Without this copper coating, a nickeled iron article will rust more quickly than will one which is galvanized (zinc coated). This is not due, however, to the action of moisture on the nickel, as it is more resistant to corrosion than is zinc, but, as mentioned above, is caused by the imperfect covering quality of nickel on iron."

2. The leather-colored Italian bees are better than the golden only because the golden have been produced by selecting color at the expense of other qualities. There are some golden bees just as good as the leather colored, but they are more likely to be less active, on account of having been selected for color mainly.

COMB HONEY—CLOVER

1. The comb honey we had which we could not find market for last fall began, shortly after taking it from the hives, to get stiff, and the capping is tough. First, we put some in a cold room and then tried some in a warm room, but find the temperature of the rooms didn't make any difference. What honey drops out is thick and we can hardly wipe it up or move it. Last summer a year ago, what comb honey we carried over got this way, and again this last season's honey. We can't offer it for sale on this account. I have watched when reading, thinking I might find some information.

2. Will you please tell us what is the best clover to plant for honey, and about how much to the acre? INDIANA.

Answers.—1. I do not see that the thickness of your honey is a fault. In fact it shows that it is exceedingly well ripened. If you want it soft, put it in a place where the temperature will rise to around 90 degrees. You will find that it will soften. Extracted honey may be heated over water up to 140 degrees without damaging it, but comb honey should not be heated much over 100.

2. In all these middle states the white clover honey of the pastures is the best you can have. Red clover sometimes yields honey, but usually the bees cannot reach the honey owing to the length of the corolla. If you do not have white clover honey in your vicinity, you had best sow a little in the pasture lands. You might also sow melilot, or sweet clover, but the latter is good to reclaim worn-out lands. It grows very rank and makes very coarse feed. It takes only a few pounds to the acre of either kind.

CLEANING CANS

Which is the best way to clean sixty-pound honey cans—as soon as they are empty or leave the can till you are ready to use it and then clean it? ILLINOIS.

Answer.—The best way to clean the honey out of a sixty-pound can is to force a jet of steam into it, then rinse it with hot water and carefully evaporate all the water, for any moisture left is sure to damage the can if it has to be kept over to the next season.

(Continued on page 262)

(Continued from page 260)

But the best way, to my mind, is to give that can to someone who can use it for some other purpose than honey. A second-hand can is sure to depreciate the honey which you put into it. We once bought a lot of emptied honey cans because they were offered at low price. But, no matter how low the price, it is still too high.

If they made the sixty-pound cans out of first-class tin, as they did in the old days, before the high tariff protected the manufacturers so that they don't have to use good tin, you could leave the cans sticking with honey until ready to use them again, but that time is past. Those cans rust much more readily than they used to do.

FOREIGN BEE PAPERS

1. Can you tell me the name and address of the French and German chief magazines on bees?

2. I would like to know also if those editors are easily able to understand English.

3. Do you know of any bee papers published in Greece or Italy?

GEORGIA.

Answers.—1. I cannot give you the names of all the principal magazines on bees in French and German, but I can give you a few:

Schweizerische Bienenzeitung, Aarau, Switzerland, price about $1.50

Leipziger Bienenzeitung, Leipzig, Germany, price about same.

Der Bienenvater, Vienna, Austria. price about same.

France Apicole, Chateauroux, Indre, France, price 12 francs, about 60 cents.

Gazette Apicole, Montfavet, Vaucluse, France, price 12 francs.

Bulletin de la Societe Romande, Daillens, Vaud, Switzerland.

Apiculture Francaise, 4 Ste Soline, Deux-Sevres, France.

L'Apiculteur, 28 Rue Serpente, Paris, France.

2. I believe if you write to any of those magazines, in English, that they will be able to reply.

3. I don't know of any bee magazines in Greece, but there are two in Italy:

L'Apicoltura Italiana, Via La Piana, 4 Ancona, Italy, price 25 lire (about $1.25).

L'Apicoltore Moderno, Corso Ponte Mosca, Torino, Italy, same price.

AN OLD QUESTION—HOW TO CONTROL MOTHS

I bought five swarms of bees last April, 1926, and three of the five swarms, after they filled the hive full and one super had about four or five pounds in one super, quit. I was busy and didn't know a single thing about bees either, and before I knew it the moth had just almost killed all of the bees. I got one swarm in another hive and saved them, but I would like to know what to do to keep the moth out. They seem to work from bottom of hive first and they were ruined before I knew it.

1. Ought I keep bees in a shady place?

MISSOURI.

Answers.—1. It is not the moths that killed your bees. Moths invade a hive, generally from the entrance, after it gets so weak that the bees cannot keep out the moths. Usually it is because they swarm and the young queen they raise fails to come back from her mating trip, but sometimes it is because the queen gets too old and dies. Then the bees die out one after another. The beekeeper who does not look inside of his hives does not know how weak they are, because they stay at the entrance during the day, but it is in the cool nights of fall that the moths get in and the hive

is soon riddled. The only thing to do is to watch your colonies and give them young queens when they need them. Moth traps are a humbug.

2. Yes, it is a good plan to keep your colonies under the shade of trees, so they may be in the shade in the summer and in the sun in the winter.

Meetings and Events

Ormond Appointed Inspector

J. V. Ormond, well known Arkansas beekeeper, formerly in the extension service of the U. S. Department of Agriculture, has been appointed State Inspector of Apiaries for that state. Because of his wide acquaintance with Arkansas bee men and his long experience in beekeeping, Ormond should give efficient service in his new field.

Interstate Meeting at Omaha, July 12-13

Beekeepers at the interstate meeting held at Sioux City last June voted to hold a similar meeting every summer. The states of Nebraska, South Dakota, Minnesota and Iowa participate, and it is proposed that each of these states take its turn in sponsoring an interstate summer meeting every fourth year. This year's meeting is being sponsored by Nebraska. One of the enjoyable features of these meetings is a tour of the apiaries of the locality. Local arrangements for this meeting are in the hands of Mr. W. R. Perry, 1209 Howard street, Omaha, Neb.

Next League Convention at San Francisco

The American Honey Producers' League will hold its next national convention in San Francisco, Wednesday, Thursday and Friday, January 25-27, 1928. Headquarters will be at the Whitcomb Hotel, 1231 Market street. Arrangements are being perfected to make this meeting of the national organization of beekeepers one of the largest and most successful that has been held.

The program calls for the convention to convene at 9 a. m. on Wednesday, January 25. Allowing for luncheon hour, the business session will continue until 3:30 p. m., at which time there will be a trip by automobiles to points of interest in and around San Francisco. An interesting entertainment is being planned for the evening. Dinner will be served in Chinatown, a unique oriental quarter close to the heart of San Francisco's business center, followed by a trip through Chinatown under special guides provided by the police department. The entire afternoon and evening entertainment will be under the personal direction of Miss Mabel T. Johnson, of the San Francisco Chamber of Commerce.

On Thursday, January 26, there will be a business session throughout the morning, and the afternoon will be given over to a visit to one of California's redwood parks, so that the big trees may be seen. In the evening the annual banquet will be held and a program of excellent speakers is promised. Sessions will conclude on Friday, January 27, with business sessions starting at 9 a. m. and continuing until all business has been transacted.

New County Association

The beekeepers of Fulton county, Illinois, recently organized a local association, with headquarters at the Farm Bureau office. F. R. Belt was recommended for local inspector and has been appointed by State Inspector Kildow to that position.

Summer Meeting at Hamilton

The American Bee Journal feels honored in that the committee in charge of the interstate summer assembly chose Hamilton as the place to hold this year's meeting. The beekeepers of Wisconsin, Minnesota, Iowa and Illinois held a joint meeting at Platteville, Wisconsin, last summer. This interstate meeting was the result of several successful meetings held by Wisconsin bee men in years past. So much enthusiasm was developed that the Wisconsin folks decided to invite the associations of adjoining states to meet with them.

Prof. H. F. Wilson, of Madison, Wisconsin, is in general charge of arrangements for the program, assisted by the secretaries of the associations of the other states mentioned. Since Missouri is so near to this year's meeting place, it is hoped that Missouri beekeepers will join in to make this summer meeting one to be long remembered.

The dates selected are August 9, 10 and 11, closing at noon on the third day, to give those who wish to do so a chance to catch any outgoing trains. Hamilton is on the hard road and can be reached from most Illinois points, regardless of weather, by auto. Those coming by train had best plan to come to Keokuk, Iowa, if they live north, south or west of Hamilton, as Keokuk is just across the river and has better railroad connections.

A general invitation is extended to all beekeepers who find it convenient to do so, to be present. A more extended announcement will appear later when the program has been arranged.

Crop and Market Report

Compiled by M. G. Dadant

We asked our correspondents to answer the following questions:

1. Amount of old crop on hand?
2. How does this compare to last year?
3. Amount of winter loss of bees?
4. How are they for strength and stores?
5. Crop prospects?

AMOUNT OF CROP ON HAND

It is pleasing to note the very small percentage of honey on hand in the northeastern states, as well as in the southeastern. In fact, one might say that there is not sufficient honey on hand to supply the demand. Another case of under supply because undoubtedly there are many beekeepers who could dispose of additional amounts of honey if they had the same to offer to their regular customers, and could do themselves some good at the same time, by keeping the customer from getting something else in the line of sweets in place of the honey.

In fact, the only states east of the Mississippi River which have a large amount of honey on hand, comparatively, are Michigan and Wisconsin, neither of which have a great deal more than last year.

It is, however, in the states west of the Mississippi that the larger amount of honey is retained. This is especially true of Minnesota and North Dakota, which have about 15 per cent of the total left on hand; Arizona, which has 10 to 15 per cent; Colorado, 15 per cent; Utah, 40 per cent; Wyoming, 30 per cent; Montana, 25 per cent; Idaho, 25 per cent; Washington, 10 per cent; Oregon, 20 per cent. In addition to this, Texas has almost 30 per cent of its crop on hand yet, and unsold.

COMPARISON WITH 1926

In practically all states east of the Mississippi River there is either about the same amount of honey left on hand as last year, or very much less.

West of the river, Texas probably has 25 per cent more honey than in 1926, at the same date, and Minnesota and North Dakota about 10 per cent more, and the intermountain states about 15 to 20 per cent more than they had a year ago.

California is carrying over very much less honey than they did last year, and the Canadian provinces are practically cleaned up, whereas last year there was a considerable carryover, especially in Ontario.

WINTER LOSS OF BEES

The winter loss so far has not been excessive, and in fact may be considered as somewhat less than last year.

The largest winter losses are noted in the northern section, Wisconsin reporting from 5 to 10 per cent, Minnesota from 10 to 15 per cent, and other states ranging in the neighborhood of 8 to 12 per cent are South Dakota, Colorado, Utah, Wyoming, Montana, Idaho, Oregon, and possibly California. It is too early to give a report on the Canadian provinces, where bees have not yet been put out of the cellar.

STRENGTH AND STORES

There seems to be a uniformity of strength in the bees, and from the general conditions throughout the United States it would appear that bees are in better shape than last year at this time. This is probably due to the fact that we have had a very open winter for outdoor-wintered bees, which has held down the loss.

This condition, of course, has its counter action in the fact that bees are in many cases reported short of stores. In fact, it would appear that the general condition is that bees are short rather than have abundance of stores, and we would warn our readers to take every possible care with their bees and give them feed during the period of shortage in the spring. Some of the states reporting worst shortages are Alabama, Indiana, Illinois, Iowa, Missouri, Michigan, Wisconsin, Minnesota, North Dakota, South Dakota, New Mexico, Arizona, Colorado, and Montana. In addition, California has had some very backward cool weather which has tended to cut down brood rearing unless stores were provided.

CROP PROSPECTS

In no year since the writer has been taking charge of the crop and market page has there been such a uniformly good report as to the prospects for honey plants the coming year. In the eastern and central western states white clover has come through abundantly and in most sections in excellent shape owing to the extreme amount of rain last fall and a desirable amount of snow during the winter. There have been some reports of the heaving of clover, but this probably has not been sufficient to make any marked effect on the clover plants this spring.

It would appear that the sections especially favored by fine prospects are the central western states, extending as far as Nebraska and Kansas. Arizona and Texas are also in extremely good shape, and California, we believe, has not had as fine prospects for many a year. The Canadian provinces also report excellent prospects, especially in the western plains provinces, where there have been excessive snows which should put the ground in the very best condition for the summer.

Taken all in all, we believe that the prospects for a honeyflow as judged by honey plant conditions at present are probably 125 per cent of last year at least.

It is to be remembered that the intermountain territory last year was very favorably situated, owing to heavy snows during the previous winter. The same is the case this year with probably more extensive snows than a year ago, so that the honey plants should be in excellent condition and there should be plenty of water for all irrigating projects. Undoubtedly, if present prospects materialize, there will have to be a very marked stiffening in efforts to sell the honey or there is apt to be a decline in prices. We do not believe there is actually an oversupply of honey, but rather, as stated many times before in these columns, an under distribution. An instance of this is given in the present year, when many beekeepers in the central west and eastern sections had very little of their own crop to dispose of, but did not go to the effort of securing honey from other sources to take care of their regular customers. This can have but one consequence, and that is drive the customers to other sweets, from which they are naturally hard to win back to honey when a crop arrives.

We will have to arrive at some manner of distribution of honey so as to take care of the short eastern sections and relieve the ever heavier producing sections of the West.

Naturally, the big carryover is in the hands of the intermountain producers, who are not able to dispose of their crop. We believe that the distributors and jobbers of honey in the East are more nearly cleaned up this year than they were last. In other words, they did not load heavily with honey, but were content rather to clean up on all old stocks and buy from hand to mouth. This condition, of course, does not apply only to the honey handler, but to many other lines as well.

CLASSIFIED DEPARTMENT

Advertisements in this department will be inserted for 5 cents per word, with no discounts. No classified advertisements accepted for less than 35 cents. Count each initial or number as one word.

Copy for this department must reach us not later than the 15th of each month preceding date of issue. If intended for classified department it should be so stated when advertisement is sent.

As a measure of protection to our readers, we require references of all new advertisers. To save time, please send the name of your bank and other references with your copy.

Advertisements of used beekeeping equipment or of bees on combs must be accompanied by a guarantee that the material is free from disease or be accompanied either by a certificate of inspection from an authorized inspector or agreement made to furnish such certificate at the time of sale.

BEES AND QUEENS

GOLDEN ITALIAN QUEENS—Untested: One, $1.00; six, $5.40; twelve or more, 80c each. Select untested. One, $1.25; six, $7.00; twelve or more, $1.00 each. State inspected. Safe arrival. Money back if not satisfied.
Sam Hinshaw, Randleman, N. C.

TRY my Caucasian or Italian three-frame nucleus, also queens, and be your own judge. Yard inspected regularly for protection of diseases. Peter Schaffhauser,
Havelock, N. C.

FINEST ITALIAN QUEENS—$1.00 each.
William R. Stephens, Wingate, Ind.

DIEMER'S bright three-banded Italian queens, mailed to you in introducing cages, May and June, $1.25; six, $6.50; twelve, $13.00. After June, $1.00; six, $5.00; twelve, $10.00.
J. F. Diemer, Liberty, Mo.

SIMMONS' QUEENS—Ready May 10. One, $1.25; six, $7.00; twelve, $13.00. Two-frame nucleus, $4.50; three-frame, $6.00. No disease.
Fairmount Apiary, Livingston, N. Y.

GOLDEN Italian queens that produce golden bees. Very gentle and good honey gatherers. Untested, $1.00; six, $5.40; twelve or more, 80c each. Tested, $1.50. Select tested, $2.50. State inspected. Safe arrival and satisfaction guaranteed. Send for price list. D. T. Gaster,
R. 2, Randleman, N. C.

BEE PACKAGES SHIPPED ON COMBS with health certificate. The southern Italian three-band stock get the honey as none other. Prices: One-pound package with select laying queen and one standard frame of brood with honey, $3.25; ten packages, $30.00. Two-pound package, $4.00; ten packages, $37.50. Three-pound package, $4.75; ten packages, $45.00. Ten per cent deposit with order and balance on date of shipment for May and June. Send your order early in advance. Reference, The People's Savings Bank and Trust Company, Mansura, La.
Victor Prevot, Mansura, La.

SPECIAL FOR MAY—Fix your own shipping date. Buy large packages; make two colonies with one package. Extra queens 85c each. One four-pound, $5.10; five four-pound, $25.00; ten four-pound, $48.00. One five-pound with two frames, $6.40; five five-pound, $31.00; ten five-pound, $57.50. Standard frames brood and honey. Prices include select untested queen each package. Live delivery guaranteed. State health certificate. Pure light three-banded Italian bees and queens.
Cloverland Apiary, Hamburg, La.

MISSOURI bred Italian queens. They show results. One, $1.00; six for $5.00.
L. E. Altwein, 1206 N. 13th St.,
St. Joseph, Mo.

CAN make prompt shipment of my high grade queens, $1.00 each; $10.00 per dozen or $75.00 per hundred for select untested. Try them and be pleased.
R. V. Stearns, Brady, Texas.

ITALIAN queens and package bees. One to four two-pound packages, $3.00 each; 5-25, $2.25 each; 25 or more, $2.00 each. For three-pound packages add $1.00. Queens extra. Queens: One to ten, $1.25 each; 10-25, $1.10 each; 25 or more, $1.00 each.
Colman Apiaries, Chico, Cal.

WILL TRADE package bees for good real estate, or anything valuable. What have you?
Van's Honey Farms, Hebron, Ind.

QUINN'S QUEENS OF QUALITY—Have no superior. "There's a reason"; are "Mendelian bred." Gray Caucasians, gray Carniolans, Italians and Cyprians. If they are Quinn's they are better. Try them. Untested, $1.50; select untested, $2.00; tested, $2.50; select tested, $3.00 each. Ten per cent off on lots of one dozen.
Charles W. Quinn, La Belle, Fla.

FOR SALE—Italian queens. Untested, one to ten, $1.00 each; eleven to twenty-five, 85c each; more than twenty-five, 75c each. Tested, $1.50 each. Satisfaction guaranteed. Ready to ship June 1 to June 10.
R. B. Grout, Jamaica, Vt.

BRIGHT THREE-BAND ITALIANS—May 15 to July 1: Queens, untested, $1.25 each; tested late fall, $1.75. Package bees, two pounds, $2.35; three pounds, $3.25. Queen extra. Mating and arrival guaranteed. Certificate.
The Allen Apiaries, Liberty, Mo.

PACKAGE QUEENS—Immediate shipment. Why take chances? Days count. If you have been disappointed in the time of delivery and quality of packages and queens, why not join our group of satisfied customers? One two-pound package with queen, $4.50; one three-pound package with queen, $5.50. Untested queens, $1.00 each. Safe arrival and satisfaction guaranteed. Health certificate with each shipment. Write for circular and price list, also prices on quantities.
J. M. Cutts & Sons, R. 1, Montgomery, Ala.

ITALIAN QUEENS—Untested, one to ten, $1.00; ten to twenty-five, 85c. Write for prices on larger quantities and on combless package bees.
Louisiana Southern Bee Farm,
R 2, Baton Rouge, La.

BRIGHT American Beauty Italian bees and queens. After May 10, special two-pound package on frame of emerging brood and honey, queen introduced, $4.25; ten or more, $4.00. Three-pound package same price. Two-pound combless package, with queen, syrup feed, $3.25 each; ten or more, $3.00. Queens, $1.00, $10.00 per dozen. Safe arrival guaranteed. State health certificate.
Tupelo Apiaria, Apalachicola, Fla.
J. L. Morgan, Prop.

KANSAS BRIGHT ITALIAN QUEENS—A. M. Hunt's strain; are gentle and hustlers; in Diemer cages. Select untested, $1.00 each; tested, $2.00 each.
C. W. Ward, Route 1, LeRoy, Kans.

SUPERIOR THREE-BANDED ITALIAN QUEENS BY RETURN MAIL—One, 80c; twelve, $9.00. Absolute satisfaction guaranteed.
W. C. Smith & Co., Calhoun, Ala.

PACKAGE BEES CHEAP—Can ship promptly several hundred combless packages of hybrids and black bees containing three pounds worker bees with purely mated Italian queen at $4.00 each, or $3.75 in lots of 25 or more. No drones will be shipped. Entire satisfaction guaranteed.
Baughn Stone, P. O. Box 444,
Clarksville, Texas.

WANTED—Orders for May delivery. Italian bees and queens. Quality of queens and full weight of bees absolutely guaranteed. I can fill packages and have bees under way in from twelve to twenty-four hours after receipt of order. Price of two-pound packages with queen, $3.50; three-pound packages, $4.65. Young queens just commenced laying, guaranteed equal to the best, $1.00 each. O. P. Hendrix, West Point, Miss.

WANTED—Bee apiary on shares, privilege buying same.
San Antonio, Texas, Gen. Del.,
A. L. Harris.

BOOKING FOR MAY AND JUNE—My golden and three-banded Italian bees and queens. Two-pound packages, one to ten, $3.25 each; each additional pound, $1.00. Liberal discount on quantity. Shipped on frame of brood and honey built from Dadant foundation, Hoffman frame. Satisfaction guaranteed, health certificate attached. Ten per cent books your order. Circular sent.
Address J. L. Gaspard, Hessmer, La.
Remember Kellogg's Cereal.
Reference, People's Sav'gs Bank & Trust Co.

FOR SALE—Golden Italian queens. One untested queen, $1.00; tested, $2.00 each. Queens ready about May 20. Satisfaction guaranteed.
J. F. Michael, R. 1, Winchester, Ind.

PETERMAN'S select Italian queens from sunny California: 1, $1.00; 6, $5.50; 12, $10.00; 25, $20.00; 100, $75.00. Safe delivery and entire satisfaction guaranteed.
H. Peterman, Lathrop, Cal.

BEES AND QUEENS—Best and cheapest. See ad on page 229. The Stover Apiaries,
Tibbee Station, Miss.

FOR SALE—About 300 hives of bees, equipped for comb and extracted honey. Write for particulars.
G. J. Westerik, 2460 S. Broadway,
Denver, Colo.

GOLDEN QUEENS producing yellow to tip. Untested, $1.00 tested, $2.00; young breeders, $10.00. Come ahead with your big orders; my apiary has doubled twice over. Satisfied customers everywhere. Safe arrival guaranteed. Print your address.
H. G. Karns, Victoria, Va.

GOLDEN ITALIAN QUEENS—I will begin shipping about May 1. Prices: Untested, $1.05; 6, $5.50; 12 to 49, 80c each; 50 or more, 75c each. Hazel V. Bonkemeyer,
R. 2, Randleman, N. C.

BOOMER QUEENS are guaranteed to give one full year's satisfactory service, or replaced free. Priced reasonable.
Holloway's Apiaries, Marietta, Okla.

PURE ITALIAN QUEENS—Untested $1.00; tested, $1.50. Two-pound package, $3.00. Add price of queen wanted. Safe arrival guaranteed after May 10. Write for prices on colonies. Birdie M. Hartle,
924 Pleasant, St., Reynoldsville, Pa.

FOR SALE—Try Palmetto Italian bees and queens; good as any, superior to many. Prices: One queen, $1.00; dozen, $9.00. Package bees, two-pound package, $3.75; five or more, $3.50 each; three-pound package, $4.75; five or more, $4.50 each. Queen in each package. Health certificate with each shipment.
C. G. Ellison, Belton, S. C.

BRIGHT THREE-BANDED QUEENS—Daughters of mothers selected for large production, good wintering and gentleness; mothers selected from over a thousand colonies located in Wyoming. Safe delivery and satisfaction guaranteed. Untested select queens, one to ten, $1.00; eleven to fifty, 95c; fifty-one and more, 90c each. Send all orders to J. L. Jones, manager and queen breeder, Mathis, Texas.
A. D. Hardy, Owner, Powell, Wyo.

THREE-BANDED ITALIAN QUEENS—Untested, $1.00; 12 or more, 80c. Tested, $1.50. Select tested, $2.50. Apiary inspected by state inspector. No disease found. Safe arrival guaranteed.
Jul Buegeler, Alice, Texas.

PACKAGE BEES—Three-band strain only. If you want good, clean bees, prompt service and fair treatment, give me a trial. Shipped on sugar syrup without comb. Two-pound package, three-band strain, with untested queen, $3.50. Ten or more, $3.25. No disease. Health certificate attached. Ten per cent books your order. Satisfaction guaranteed. William Piefer,
Box 83, Gause, Texas.

LISTEN—If you wish to purchase guaranteed queens, write for our circular and price list.
Carolina Bee Co., W. O. Curtis, Mgr.,
Graham, N. C.

PACKAGE bees and queens. Charles Wallace, Box 35, R. 1, Glenn, Cal.

BEES AND QUEENS FOR SALE—Let us figure with you for your 1927 bees and queens. Queens, $1.00 each; $10.00 per dozen. One pound of bees with queen, $2.90; two lbs. with queen, $4.50, charges paid to your P. O.; $70.00 per hundred.
Graydon Bros., R. 4, Greenville, Ala.

PLACE your order with us for early queens. Caucasian breeders, daughters of 1926 imported mothers, ready for shipment after April 1. Italians of 14 years' selecting. Caucasian untested, one, $1.50; six, $7.50; twelve, $14.00; one hundred, $100.00. Tested, each, $2.50 after May 15. Italians, one, $1.00; six, $5.50; twelve, $10.00; one hundred, $70.00. Tested, each, $1.50. Pure mating, safe arrival guaranteed in U. S. and Canada. Queens for export carefully packed, safe arrival not guaranteed.
Tillery Bros., Route 6,
Greenville, Ala., U. S. A.

GOLDEN UNTESTED QUEENS—Gentle and good honey gatherers as can be found; $2.00 each. Tested, $4.00 each. Best breeders, $20.00. Over thirty years a Golden Italian breeder.
J. B. Brockwell, Barnetts, Va.

HIGHEST grade Italian queens—Tested, $1.50; untested, 75 cents. Package bees, one pound, $1.50; two pounds, $2.50; three pounds, $3.25. Have had no disease. State inspection certificate with each shipment. Safe delivery guaranteed.
T. L. Davis, Buffalo, Leon Co., Texas.

FOR SALE—Two-pound package Italian bees with queen, $3.50; three-pound package, $4.00. Discount on 25 packages or more. Inspection certificate with each shipment. Book your order early to avoid delay. Write me. J. L. Leath, Corinth, Miss.

FOR WEAVERS' young queens and honey-gatherers, see page 268.

FOR SALE—Two-pound package Italian bees with select untested queen $3.00. All bees shipped with health certificate attached. The Mangham Apiaries Co.,
C. S. Duncan, Prop.,
Mangham, La.

TRY OUR BEES AND QUEENS — $ The most for your $. Ten to twenty-five 2-lb. package, $2.00 each; one to ten 2-lb. package, $2.50 each. Queens $1.00 extra. Queens, the best light Italians, at 75c each for (50) fifty or more on orders booked by April 1. Safe arrival at your delivery station guaranteed, and you must be satisfied before our dealings are complete. Our queens are personally raised and are of the best. Give them a trial.
Salida Apiaries,
T. L. Nicolaysen, Prop.,
Salida, Calif.

GOLDEN Italian queens and nuclei (or package bees) for 1927; the big, bright, hustling kind (the kind that gets the honey). Satisfied customers everywhere. Untested, $1.00 each; 6, $5.00; 12, $10.00; 100, $75.00. Tested, $2.00 each. Two-frame nuclei or two-pound package with queen, $4.50 each; ten or more, $4.00 each. Safe arrival guaranteed. Health certificate furnished. E. F. Day, Honoraville, Ala.

BOOKING orders for spring delivery. I have one of the best packages offered: two frames with brood and honey, two pounds bees, and one untested queen introduced. One to four packages, $6.00; over five packages, $5.00, f. o. b. here. Hoffman frames, some built on Dadant wired foundation. Twenty per cent books order. All bees shipped with health certificate.
L. J. Bond, Big Bend, La.

BEES AND QUEENS for spring delivery. Quick service and satisfaction guaranteed. Twenty per cent will book your order. Three-banded Italian bees and queens. Try them. They are gentle and good honey gatherers. One 2-lb. package and untested queen $3.50. For additional pound add $1.00. Delivery begins April 15.
Raoul Domingue, Erwinville, La.

"SHE-SUITS-ME" QUEENS—Three-banded stock. None better. Untested queens from May 15 to June 15, $2.00; after June 15, $1.50. Introduction guaranteed.
Allen Latham, Norwichtown, Conn.

CAUCASIAN QUEENS—Untested, $1.50; tested, $2.50. Safe delivery guaranteed.
H. Rauchfuss, 3100 S. Ancona St.
Englewood, Colorado.

LEATHER COLORED ITALIAN QUEENS—$2.00; after June 1, $1.00. Tested, $2.00.
A. W. Yates,
15 Chapman St., Hartford, Conn.

GOLDEN THREE-BANDED and Carniolan queens. Tested, $1.00; untested, 75c each. Bees in 1-pound package, $1.50; 2 pounds, $2.50; 3 pounds, $3.25. Safe delivery guaranteed. C. B. Bankston,
Box 65, Buffalo, Leon Co., Texas.

EARLY package bees and highest grade Italian queens. Our only business is Bees and Queens. We do not produce honey, deal in supplies or sell off a few old bees in the spring as a side line. Our colonies are worked exclusively for the production of young, vigorous, healthy worker bees for packages. Colonies are drawn on about every two weeks from March 20 to June 20. Two- and three-pound packages. Fifty pounds or more $1.00 per pound. Select three-band Italian queens $1.00 each. Ten per cent deposit will book order and reserve shipping date. Large orders booked in advance will receive special prices. We guarantee both safe arrival and satisfaction.
J. E. Wing, Cottonwood, Calif.
Most Northern Breeder in California.

PACKAGE BEES—See larger ad on page 267 or write for prices.
John A. Williams, Box 178, Oakdale, La.

BOOKING FOR MAY DELIVERY 1927—Try Dalton's introduced, laying-enroute to you queens in packages. Save the risk of introducing her, gain the days it takes for her to get to laying and make you brood to emerge into bees. Two frames of honey brood and bees, well covered, two additional pounds shaken in, a good young Italian queen on those combs laying before she starts to you. Price f. o. b. Bordelonville, $6.00 per single package; 20 per cent cash books your order. Frames, Standard Hoffman, largely built on Dadant's Wired Foundation; bees and queens, light Italians, called Goldens. Health certificates on every package. Remember that last season I rejected more orders after filling to capacity than I accepted. Satisfied customers for reference in most states.
Jes Dalton, Moreauville, La.

EAT KELLOGG'S CEREALS BECAUSE HE IS BOOSTING HONEY.

FOR SALE

FOR SALE—Five strong colonies Italian bees in new ten-frame Root hives. Dadant wired foundation. No disease.
Rev. Enslow, Rochester, Ill.

FOUR-ROOM suburban property with garage, about one acre, Indianapolis, Ind. Good location. Will trade equity of $500 for standard bee equipment.
Orin Jessup, 615 Traction Terminal Bldg.

FOUR Jumbo metal cover hives, two with drawn combs, two with full sheets three-ply Airco foundation; four hive stands, six 4x5 section supers with sections and foundation, two ventilated escape boards, four Boardman entrance feeders with caps. All ten-frame, used three seasons. No disease and satisfaction guaranteed. Price $25.
O. S. Ward, Obion, Tenn.

FOX AND FUR FARMING—The fastest growing and the most profitable industry in the world. Our monthly publication, seven years old, prints all the news. Sample copy 25c. Subscription $2.00 per year in United States, $2.25 in Canada.
American Fox and Fur Farmer,
St. Peter, Minn.

FOR SALE—40-acre poultry and bee farm. Well improved land, suitable for dairy or grain farming. Good well, house, barn, two chicken houses, hog house, fence, etc. $4500. Write for information.
Hugo Schloe, Ortley, S. D.

FOR SALE—Twelve colonies bees, new reversible extractor with 12-inch baskets, other equipment.
W. E. Lyman, R. 1, Northampton, Mass.

FOR SALE—200 ten-frame reversible new bottoms.
Van's Honey Farms, Hebron, Ind.

ALLEN ENTRANCE FEEDER—Does not leak, robber proof, visible, easy to refill. Just the thing to build up those weak colonies for the honeyflow. Price 25c.
Arthur Allen, Liberty, Mo.

FOR SALE—One-frame observation hive; one eight-frame observation hive with comb honey super; 75 Alexander feeders for eight or ten hives, complete. All at half catalog price. Good articles.
George Seastream, Moorhead, Minn.

FOR SALE—225 colonies bees in eight- and ten-frame hives. Complete comb honey equipment, 4¼x1⅞ supers. About 75 extracting supers. No disease. Excellent location. Good reason for selling.
Olan Tackaberry, Cantril, Iowa.

SLIGHTLY soiled copies of "Beekeeping in the South," a cloth-bound book well illustrated, for only 49 cents per copy while they last. Regular price is $1.00. The damage to these books is very slight and in some cases would hardly be noticed.
American Bee Journal, Hamilton, Ill.

FOR SALE—We are constantly accumulating bee supplies, slightly shopworn, odd sized, surpluses, etc., which we desire to dispose of and on which we can quote you bargain prices. Write for complete list of our bargain material. We can save you money on items you may desire from it.
Dadant & Sons, Hamilton, Illinois.

FOR SALE—Fifty colonies of Davis Italian bees in ten-frame dovetailed hives with metal covers, inner covers, combs built on Dadant's wired brood foundation. Guaranteed free from disease. Certificate with each shipment. Price on request.
S. J. Griggs, Maumee, Ohio.

FOR SALE—Damaged sugar for bee feed.
Winkler Honey Co., Joliet, Ill.

FOR SALE—One eight-frame Root automatic power extractor, one four-frame hand power extractor, both in first-class condition. Prices on request.
Weber Brothers, Laurel, Mont.

OWING to slight changes in management, we offer a large list of bee supplies, new and used. All bargains. Write for list.
Winkler Honey Co., Joliet, Ill.

FOR SALE—Cuthbert red raspberry plants, any quantity, at $10.00 per thousand; 500, $600. Less than this, $1.50 per 100.
S. J. Griggs, Maumee, Ohio.

HONEY AND BEESWAX

FOR SALE—Light amber honey from clover and goldenrod.
Lewis Klaty, Carsonville, Mich.

FOR SALE—Clover honey in new 60-pound cans, 9c per pound.
Joseph H. Hoehn, Ottoville, Ohio.

FANCY white tupelo extracted and bulk comb, packed in five-pound tin.
J. L. Morgan, Tupelo Apiaries,
Apalachicola, Fla.

CLOVER HONEY—9c. Sample 15c. New Lewis-Quinby hive bodies with frames, crate five, $7.00.
Edward Klein, Waukegan, Ill.

"STURDEVANT'S HONEY"—Extracted or comb. St. Paul, Nebraska.

FOR SALE—Or trade for honey, bees, or what have you: One Lewis capping melter in good condition; 200 ten-frame comb honey supers 4¼x1⅞.
William Bigel, Barrington, Ill.

BUCKWHEAT extracted honey for sale. Five-pound pail 80c.
Edward Hogan, 179 Gibson St.,
Canadaigua, N. Y.

FOR SALE—Large stock first-class white clover, basswood, sweet clover, light amber and buckwheat extracted honey. Producers who need more, dealers and solicitors should write us about their wants.
A. I. Root Company,
224 W. Huron St., Chicago, Ill.

FOR SALE—White sweet clover extracted honey and fancy white comb in shallow frames. Quality goods that will please your trade. Write for prices.
The Colorado Honey Producers' Ass'n,
Denver, Colo.

WINKLER choice clover honey. Write for new reduced prices in order to close out.
Edw. A. Winkler, Joliet, Ill.

SWEET clover extracted honey, not extracted until thoroughly ripe. Write for prices, stating quantity. Sample 15c.
Arthur Beals, Oto, Iowa

FOR SALE—Fine clover honey in new 60's. Free of disease. Twelve dollars per case.
Newman I. Lyle, Sheldon, Iowa.

FOR SALE—Best clover extracted honey in new sixties. Say how much you can use and let us quote you our price.
E. D. Townsend & Sons, Northstar, Mich.

HONEY FOR SALE—Any kind, any quantity. The John G. Paton Co.,
217 Broadway, New York.

FOR SALE—Northern white extracted and comb honey. M. W. Cousineau,
Moorhead, Minn.

FOR SALE—Ohio white clover honey $12.00 per case; in ten-case lots, $10.80 per case; twelve 5-lb. pails, $8.00; chunk honey, two 5-lb. pails $10.00. Sample 15c.
F. W. Summerfield, Waterville, Ohio.

FOR SALE—White extracted honey in five-pound pails. Twelve pails, $9.60; fifty, $37.50; one hundred, $70.00, f. o. b. Jenison. Also northern bred Italian queens.
Jay Cowing, Jenison, Mich.

FOR SALE—Excellent quality clover honey in new 60-pound cans. Sample.
V. L. Watts, Alto, Mich.

SHALLOW frame white comb honey and white extracted honey.
The Colorado Honey Prod. Ass'n,
Denver, Colo.

FOR SALE—White clover honey in 60-lb. cans. None finer.
J. F. Moore, Tiffin, Ohio.

FOR SALE—Choice clover extracted honey packed in new 60-pound cans and cases.
J. D. Beals, Dwight, N. Dak.

FOR SALE—Excellent quality clover and basswood honey, 10c per pound, in new 60's. Sample.
Ohmert & Son, Dubuque, Iowa.

HONEY WANTED—Several thousand cases white clover comb honey, size 4¼x4¼x1⅞. Must be white and strictly graded, fancy and No. 1. No other grade wanted; also extracted. Send sample, give quantity and price wanted. We pay cash.
A. L. Haenseroth,
4161 Lincoln Ave., Chicago, Ill.

"BEEWARE" and Dadant's Wired Foundation for the Northwest. Catalog prices. F. O. B. Fromberg, Montana. Beeswax wanted. Write for prices.
B. F. Smith, Jr., Fromberg, Mont.

FOR SALE—Our own crop amber fall honey in barrels and cans. State quantity wanted and we will quote prices. Samples on request.
Dadant & Sons, Hamilton, Ill.

HONEY FOR SALE—In 60-lb. tins. White clover at 12c lb.; white sage at 12c lb.; white orange at 13c lb.; extra L. A. sage at 11c lb. Hoffman & Hauck, Inc.,
Ozone Park, New York.

SUPPLIES

BEE SUPPLIES—Hive bodies, 75c each; covers and bottoms, 50c each. Other bargains. Valley Bee and Honey Co.,
Box 703, Weslaco, Texas.

ROBINSON'S comb foundation will please the bees, and the price will please the beekeeper. Wax worked at lowest rates.
E. S. Robinson, Mayville, N. Y.

ROOT bee supplies and a new moth killer. More efficient than carbondisulphide and will not explode; $3.00 per gal., $2.00 per half gallon.
A. V. Small, Augusta, Kans.

BEST QUALITY bee supplies, attractive prices, prompt shipment. Illustrated catalog on request. We buy beeswax at all times and remit promptly.
The Colorado Honey Producers' Ass'n,
Denver, Colo.

FOR SALE—Good second-hand 60-lb. cans, two cans to a case, boxed. We have large stocks of these on hand. Please write for prices if interested. We are offering only good cans and good cases.
C. H. W. Weber & Co., Cincinnati O.

MISCELLANEOUS

BEEKEEPERS ITEM—Modern beekeeping methods and helpful hints. Special offer: Twelve back numbers, all different, and three months' trial subscription, 50c. Fifteen magazines for half a dollar.
The Beekeepers Item,
Box 838, San Antonio, Texas.

WESTERN HONEY BEE, 2823 E. 4th St., Los Angeles, Calif., published by Western beekeepers, where commercial honey production is farther advanced than in any other section of the world. $1.00 per year. Send for sample copy.

MAKE queen introduction sure. One Safin cage by mail, 25c; 5 for $1.00.
Allen Latham, Norwichtown, Conn.

HAVE YOU any Bee Journals or bee books published previous to 1900 you wish to dispose of? If so send us a list.
American Bee Journal, Hamilton, Ill.

THE DADANT SYSTEM IN ITALIAN—The "Dadant System of Beekeeping" is now published in Italian, "Il Systema d'Apicoltura Dadant." Send orders to the American Bee Journal. Price $1.00.

GLEANINGS IN BEE CULTURE, published at Medina, Ohio, is the most carefully edited bee journal in the world. Its editor-in-chief is George S. Demuth. Its field editor is E. R. Root. Ask for sample copy.

WANTED

WANTED—To exchange or buy: Two or three Quimby uncapping knives.
F. Rimkus, Knippa, Texas.

WANTED—To buy 500 stands of bees.
Ezra Ross, R. 3, Morris, Ill.

WILL give experience and small wage to strong, active young man for help in apiaries May to November.
Earl L. Baker, Lake City, Mich.

WANTED—Experienced man for season. State age, experience, salary expected.
A. E. Schellhorn, Huntley, Mont.

WANTED—To exchange package bees or queens for foundation.
Valley Bee & Honey Co.,
Box 703, Weslaco, Texas.

WANTED—Experienced man for season of 1927.
B. F. Smith, Jr., Fromberg, Mont.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade prices, charging but 5c a pound for wax rendering.
Fred W. Muth Co.,
204 Walnut St., Cincinnati, Ohio.

Cover Picture of John Anderson

John Anderson is the editor of the "Scottish Beekeeper" and one of the foremost beekeepers of Scotland. Our readers have seen much about him in the past few years.

This is an excellent family group. On the original photo Mr. Anderson speaks of the boys as first drone _ _ _ _ _, second drone _ _ _ _ _. We venture the guess that they will prove to be workers and an honor to their parents.

Le Stourgeon Seriously Hurt

As we go to press word is received that Guy Le Stourgeon, formerly manager of the Texas Honey Producers' Association, and editor of the Beekeepers' Item, has been seriously injured in an automobile accident and is just now able to hobble about on crutches.

The exact nature of the injury and the cause of it we do not know, but Guy has our warmest sympathy and the earnest wish that a quick return to normal will favor him.